



# CTE Administrative Planning Guide 2006-2007

## **Helping administrators, teachers, and counselors**

- ❑ coordinate course offerings
- ❑ schedule courses
- ❑ advise students regarding graduation requirements and CTE programs of study

July 2006  
Commonwealth of Virginia  
Department of Education  
Office of Career and Technical Education Services  
Richmond, Virginia 23218-2120



# **CTE Administrative Planning Guide**

---

## **Developed by**

Office of Career and Technical Education Services  
Virginia Department of Education

## **Edited and produced by**

CTE Resource Center

©Virginia Department of Education, 2006

Virginia Department of Education  
P.O. Box 2120  
Richmond, VA 23218-2120

Edited and produced by  
CTE Resource Center  
Margaret L. Watson, Administrative Coordinator  
Anita T. Cruikshank, Writer/Editor

The Center is a grant project of the Virginia Department of Education, Office of Career and Technical Education Services and is administered by Henrico County Public Schools, Office of Technical and Continuing Education.

CTE Resource Center  
2002 Bremo Road, Lower Level  
Richmond, VA 23226  
Phone: 804/673-3778  
Fax: 804/673-3798  
Web address: <http://CTEresource.org>

## **Notice to the Reader**

In accordance with the requirements of the Civil Rights Act and other federal and state laws and regulations, this document has been reviewed to ensure that it does not reflect stereotypes based on sex, race, or national origin.

The Virginia Department of Education does not unlawfully discriminate on the basis of sex, race, color, religion, handicapping conditions, or national origin in employment or in its educational programs and activities.

The activity that is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education, and no official endorsement by the U.S. Department of Education should be inferred.

## Foreword

---

The *CTE Administrative Planning Guide* (APG) includes information to help local school divisions plan and schedule instructional programs and make the best use of instructional resources. Like last year's edition, this document is organized around specific program areas and the courses, course sequences, and certifications available to students as they plan for and begin preparing for careers. This reorganization resulted from requests of local administrators.

Each program area section contains the following information:

- Course titles and descriptions, including information on many new courses
- Approved course sequences that fulfill the requirement for two sequential electives and prepare students for career entry and continuing education
- Certification, licensure, and occupational competency assessment requirements
- The career cluster to which each course belongs for federal reporting purposes.

In addition, the 2006-2007 edition of the APG includes updated certification information and revised information related to verified credit and diploma seals. This revision of the APG includes certifications approved by action of the Virginia Board of Education at its November 2005 meeting. This information will be updated following the Board's November 2006 meeting.

Please use the directory at the back of the guide to contact us with comments, concerns, and suggestions as well as questions concerning the content of the APG. We look forward to your suggestions for improvement.

To make it easier to use, this edition of the APG is available in two versions (PDF and Microsoft Word). This means the following:

- You may print the entire guide or selected sections in PDF.
- You may download any section in a Word format, make changes or additions applicable to your local school, and print out if desired.
- The cover and dividers are available only in PDF.

We hope this flexibility will make the guide more helpful to you.

Elizabeth M. Russell, Director  
Office of Career and Technical Education Services  
Virginia Department of Education



## **Contents of the Guide**

---

### **Introduction and Index**

**Section 1: Agricultural Education Courses**

**Section 2: Business and Information Technology Courses**

**Section 3: Family and Consumer Sciences Courses**

**Section 4: Health and Medical Sciences Courses**

**Section 5: Marketing Courses**

**Section 6: Technology Education Courses**

**Section 7: Trade and Industrial Education Courses**

**Section 8: Career Connections Courses**

**Section 9: Certifications, Licenses, and Assessments**

**Section 10: Verified Credit, Diploma Seals, and Board-Approved Credentials**

**Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations**

**Section 12: Career Exploration and Middle School**

**Section 13: Career Awareness and Elementary School**

**Section 14: Comments and Questions**





## **Introduction to the APG 2006-2007**

### **Get a peek at what's ahead...**

- Terms and Definitions
- Overview of Verified Credit and Diploma Seals
- Overview of the APG 2005-2006 Edition
- Index of course information





## Introduction

The *CTE Administrative Planning Guide* is designed to assist counselors, teachers, and administrators who schedule student enrollment in elective CTE courses. This guide presents information about courses, course descriptions, course sequences, applicable certifications/licenses, and career clusters by program area.

### About the Vocabulary

---

This edition of the *Administrative Planning Guide* uses terms that are defined or explained as follows:

#### ***Two Sequential Electives***

Students who are pursuing the Standard Diploma or the new Modified Standard Diploma must complete two sequential electives. *Two sequential electives* comprise a concentration of courses from a variety of options, including Career and Technical Education. Completing any CTE concentration or specialization, including prerequisites, if applicable, will meet the requirement.

#### ***Concentration and Specialization Sequences***

A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide (Sections 1-8).

A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide (Sections 1-8).

A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### ***Student-Selected Verified Credit***

A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.

A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.

A *student-selected verified credit* is a credit for a course that includes a test approved by the Virginia Board of Education. (According to SOA 8 VAC 20-131-110.B, footnote 5: A student may utilize additional tests for earning verified credit in computer science, technology, or other areas as prescribed by the Board in 8 VAC 20-131-110.B.)

In November 2005, the Board of Education approved selected industry certification, state licenses, and occupational competency assessments from the National Occupational Competency Testing Institute (NOCTI) for use in awarding student-selected verified credit in approved career and technical education courses or course sequences. These student-selected verified credits are valid for the remainder of the 2005-2006 school year and until the Board approves any revisions during the 2006-2007 school year.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster assignment for each course is also identified in the program area sections (Sections 1-8).

Additional information and samples of CTE course selection using career families are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Criteria for Earning Student-Selected Verified Credit

---

Student-selected verified credit will be awarded for certification or licensure examinations that meet all of the following criteria:

- Industry certification or licensure examinations that are approved to satisfy the requirements for the Board of Education's Career and Technical Education Seal and the Board of Education's Seal of Advanced Mathematics and Technology will satisfy requirements for student-selected verified credits.
- Occupational competency assessments from the National Occupational Competency Testing Institute (NOCTI) are approved for verified credit only.
- For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure. In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. **Exception:** No teacher certification requirement exists for the award of verified credits to students passing a selected NOCTI assessment related to their CTE program.
- A standard credit may not be verified more than once.

One student-selected verified credit will be awarded for passing each certification or licensure examination or occupational competency assessment that meets all of the above criteria if the student earns one standard unit of credit only in the career and technical education concentration or specialization.

Two student-selected verified credits will be awarded for passing each certification or licensure examination or occupational competency assessment that meets all of the above criteria if the student

- meets the CTE concentration or specialization course requirements for program completer, and
- earns at least two standard units of credit in the CTE concentration or specialization.

## Diploma Seals

---

In September 2000, the Board of Education approved criteria for selecting and approving certifications and licenses to satisfy the requirements for the Career and Technical Education Seal and the Advanced Mathematics and Technology Seal.

The examination must be in a CTE field that confers a certification from a recognized industry, trade, or professional association. For the technology requirements of the Board's Seal of Advanced Mathematics and Technology, students may elect to pass a Board-approved exam that confers college-level credit in a technology or computer science area.

- The examination must be standardized and graded independently of the school or school division in which the student is enrolled.
- The examination must be knowledge-based.
- The examination must be administered on a multistate or international basis.
- The course of study for which the student receives a certification must be designed to prepare the student for an occupation or occupational area or for the college-level credit in an occupation or occupational area that is technology-driven.

To earn a *Career and Technical Education Seal*, a student must

- fulfill the requirements for either a standard or advanced studies diploma, and
- complete a prescribed sequence of courses in a CTE concentration or specialization, and
- maintain a B or better average in CTE courses, or
- pass an exam that confers certification from a recognized industry, trade, or professional association or
- acquire a professional license in a career and technical field.

To earn an *Advanced Mathematics and Technology Seal*, a student must

- fulfill the requirements for either a standard or advanced studies diploma, and
- satisfy all mathematics requirements for the Advanced Studies Diploma with a B average or better, and
- pass an exam that confers certification from a recognized industry, trade, or professional association, or
- pass an exam approved by the Board that confers college-level credit in a technology or computer science area.

## About the APG

---

This 2006-2007 edition of the *Administrative Planning Guide* is divided into the following sections:

**Introduction** defines terms of interest related to graduation requirements. It also contains a helpful index that locates each course description, course sequence, and certification description.

Each of the following program area sections provides course titles and descriptions; outlines completer sequences; identifies applicable certifications, licenses, and assessments; and names the career family in which the students in the course should be reported:

- **Section 1, Agricultural Education:** Courses that focus on agriculture and natural resources
- **Section 2, Business and Information Technology:** Courses that focus on information systems, finance, management, office administration
- **Section 3, Family and Consumer Sciences:** Courses that focus on early childhood education, consumer services, interior design, fashion design, foods/nutrition, hospitality, family and human services, home management
- **Section 4, Health and Medical Sciences:** Courses that focus on nursing, EMT, dental, surgical technician, physical and occupational therapy, veterinary aide
- **Section 5, Marketing:** Courses that focus on the buying, transporting, storing of goods; promotion of goods and services; market research; marketing management
- **Section 6, Technology Education:** Courses that focus on design, technology, engineering

- **Section 7, Trade and Industrial Education:** Courses that focus on communications, construction, metalworking, personal and public services, transportation
- **Section 8, Career Connections:** Courses that focus on career exploration, entrepreneurship, leadership, Education for Employment, Teacher Cadet

**Section 9, Verified Credits, Diploma Seals, and Board-Approved Credentials** explains the relationships among Board-approved credentials (examinations for industry certifications, licenses, and nationwide assessments) and graduation requirements (verified credits and diploma seals —CTE seal and Advanced Mathematics and Technology seal).

**Section 10, Descriptions of Certifications, Licenses, and Assessments** presents each credential, how to earn it, its provider, and a list of courses that may help students prepare for the applicable examination.

**Section 11, Instructional Planning with Career Clusters, Career Pathways, and Occupations** explains the nationally accepted concept of career clusters and how this organizational system helps with career exploration and student course selection.

**Section 12, Career Exploration and Middle School** presents topics for middle school career exploration and the courses that support them.

**Section 13, Career Awareness** presents courses that expose elementary school students to career skills.

**Section 14, Comments and Questions** contains contact information for the Virginia Department of Education, Office of Career and Technical Education Services.

## **Index**

---

The index locates by page number the specific information related to each course. It begins on the next page.

## Agricultural Education

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Middle School Courses</b>				
Introduction to Agriscience Grade 6 8002	12-1			
Agriscience Exploration Grade 7 8003	12-1			
Agriscience and Technology Grade 8 8004	12-2			
<b>Fundamental Courses</b>				
Agricultural Mechanics and Basic Plant Science 8006	1-2			
Agricultural Mechanics and Basic Animal Science 8008	1-3			
<b>Agricultural Business</b>				
Agricultural Business Fundamentals 8022	1-3	1-3		
Agricultural Business Operations 8024	1-3	1-3		
Agricultural Business Management 8026	1-3	1-3		
<b>Agricultural Power</b>				
Introduction to Power, Structure, and Technical Systems 8016	1-4	1-5	Outdoor Power Equipment Certifications (EETC)	10-33
			Agriculture Mechanics Assessment (NOCTI)	10-3
Agricultural Structural Systems 8017	1-4	1-5		
Agricultural Power Systems 8018	1-4	1-5	Agriculture Mechanics Assessment (NOCTI)	10-3
Agricultural Fabrication and Emerging Technologies 8019	1-4	1-5		
Advanced Agricultural Power Systems 8020	1-4	1-5		
<b>Agricultural Production</b>				
Agricultural Production Technology 8010	1-5	1-6	Commercial Pesticide Applicator Certification Examination (VA Department of Agriculture and Consumer Services)	10-13
			Production Agriculture Assessment (NOCTI)	10-35
Agricultural Production Management 8012	1-5	1-6	Commercial Pesticide Applicator Certification Examination (VA Department of Agriculture and Consumer Services)	10-13
			Production Agriculture Assessment (NOCTI)	10-35
Operating the Farm Business 8014	1-5	1-6		
<b>Natural Resources Management</b>				
Introduction to Natural Resources 8040	1-6	1-7	Forestry Products & Processing Assessment (NOCTI)	10-20
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Forestry, Wildlife, and Soil Management 8042	1-6	1-7	Forestry Products & Processing Assessment (NOCTI)	10-20
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Natural Resources Business Management 8044	1-6	1-7	Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Horticulture</b>				
Horticulture Sciences 8034	1-7	1-9	Greenhouse Operators Certification Program (Southern Greenhouse Growers Association/Virginia Flower Growers Association)	10-22
			Floriculture-Greenhouse Assessment (NOCTI)	10-19
			Horticulture-Floriculture Assessment (NOCTI)	10-23
			Horticulture-Landscaping Assessment (NOCTI)	10-23
			Horticulture-Olericulture Assessment (NOCTI)	10-23
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Floral Design I 8055	1-7	1-9	Greenhouse Operators Certification Program (SGGA/VFGA)	10-22
Floral Design II 8056	1-7	1-9	Greenhouse Operators Certification Program (SGGA/VFGA)	10-22
Floriculture 8038	1-8	1-9	Greenhouse Operators Certification Program (SGGA/VFGA)	10-22
			Horticulture-Floriculture Assessment (NOCTI)	10-23
			Floriculture-Greenhouse Assessment (NOCTI)	10-19
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Greenhouse Plant Production and Management 8035	1-8	1-9	Greenhouse Operators Certification Program (SGGA/VFGA)	10-22
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
			Horticulture-Olericulture Assessment (NOCTI)	10-23
Landscaping 8036	1-8	1-9	Horticulture-Landscaping Assessment (NOCTI)	10-23
			Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Specialty Horticulture Arts 8037	1-8	1-9	Greenhouse Operators Certification Program (SGGA/VFGA)	10-22
<b>Biotechnology Program</b>				
Biotechnology Foundations 8085	1-9	1-10		
Biotechnology Applications in Agriculture 8087	1-10	1-10		
<b>Specialized Courses</b>				
Applied Agricultural Concepts 8072/8073	1-10	1-10		
Biological Applications in Agriculture 8086	1-11	1-11		
Ecology/Environmental Management 8045/8046	1-11	1-11		
Equine Management and Production 8015/8080	1-12	1-12		
Small Animal Care I 8083	1-12	1-12		
Small Animal Care II 8084	1-12	1-12		
Veterinary Science 8088	1-12	1-12		
Small Engine Repair 8021/8082	1-13	1-13	Outdoor Power Equipment Certification (EETC)	10-33
			Air-Cooled Gas Engine Assessment (NOCTI)	10-4

<b>Course</b>	<b>Course Description Page #</b>	<b>Course Sequences Page #</b>	<b>Certification, License, Assessment Available</b>	<b>Credential Description Page #</b>
Turf Establishment and Maintenance 8051	1-13	1-13	Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Advanced Turf Grass Applications 8054	1-13	1-13	Commercial Pesticide Applicator Certification Examination (VA Dept. of Agriculture and Consumer Services)	10-13
Farm Equipment Operator 8052	1-14	1-14		
Introduction to Leadership 9091	1-14	1-14		
Leadership Development	1-14	1-14		
<b>Special Courses</b>				
Agricultural Education for the Disadvantaged 8050	1-14			
Agricultural Education for the Disabled 8053	1-14			
General Mechanics for the Disadvantaged 8070	1-14			
Agricultural Education Dual Enrollment – Postsecondary 8095	1-14			

## Business and Information Technology

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Middle School/Foundation Courses</b>				
Keyboarding (Middle School) 6150	12-1			
Computer Solutions 6609/6610	12-1			
Make It Your Business 6110/6111	12-2			
<b>Occupational Courses</b>				
<i>Note:</i> For Business and Information Technology occupational courses, certifications are marked as follows: *Certification is considered an entry-level certification. ** Certification is considered a mid-level certification and may require significant curriculum “mapping.” *** Certification is considered an advanced-level certification and will need to be “mapped” to curriculum at the academy level.				
Accounting 6320	2-3	2-3	Accounting—Basic Assessment (NOCTI)	10-2
			Accounting—Complete Assessment (NOCTI)	10-2
			Certification for Legal Professionals* (ALS) when combined with Office Administration and Legal Systems Administration	10-9
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
Advanced Accounting 6321	2-3	2-3	Accounting—Basic Assessment (NOCTI)	10-2
			Accounting—Complete Assessment (NOCTI)	10-2
			Certification for Legal Professionals* (ALS) when combined with Office Administration and Legal Systems Administration	10-9
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
Business Law 6131	2-4	2-4	IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
Business Law 6132	2-4	2-4		
Business Management 6135	2-5	2-5	IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
Business Management 6136	2-5	2-5		
Computer Applications 6611	2-6, 12-2	2-6	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
			MOS* (Microsoft Office Specialist) (Microsoft) (pass any one unique exam at core level)	10-30
Computer Applications 6617	2-6, 12-2	2-6		
Computer Information Systems 6612	2-7	2-7	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
			MOS* (Microsoft Office Specialist) (Microsoft)	10-30

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Computer Information Systems 6614	2-7	2-7		
Advanced Computer Information Systems 6613	2-7	2-7	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
			MOS* (Microsoft Office Specialist) (Microsoft)	10-30
Advanced Computer Information Systems 6615	2-7	2-7		
Computer Network Software Operations 6650	2-9	2-9	A+* (CompTIA)	10-1
			A+ Certification: Operating Systems Technologies Examination*	10-1
			A+ Certification: Core Hardware Examination*	10-2
			Brainbench Network Administration Certifications*	10-6
			Brainbench Systems Administration Certifications*	10-6
			Brainbench Technical Support Certifications*	10-6
			Certified Novell Administrator* (Novell)	10-11
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination*	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination*	10-11
			CIW Professional* (Prosoft Learning)	10-11
			Customer Support Specialist Certification* (Help Desk Institute)	10-16
			Fundamentals of Wireless LANs Certificate* (Cisco Systems)	10-21
			IC <sup>3</sup> * (Certiport)	10-24
			iNet* (CompTIA)	10-25
			International Computer Driving License* (ICDL US)	10-25
			IT Essentials Certificate, Level 1* (Cisco Systems)	10-26
			IT Essentials Certificate, Level 2* (Cisco Systems)	10-26
			Linux +* (CompTIA)	10-27
			Microsoft Certified Professional (MCP)* (Microsoft)	10-29
			MOS* (Microsoft)	10-30
			Unix Certificate* (Cisco Systems)	10-37
			Voice and Data Cabling Certificate* (Cisco Systems)	10-38

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Advanced Computer Network Software Operations 6651	2-9	2-9	A+* (CompTIA)	10-1
			A+ Certification: Operating Systems Technologies Examination*	10-1
			A+ Certification: Core Hardware Examination*	10-2
			Brainbench Network Administration Certifications*	10-6
			Brainbench Systems Administration Certifications*	10-6
			Brainbench Technical Support Certifications*	10-6
			Certified Novell Administrator* (Novell)	10-11
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination*	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination*	10-11
			CIW Professional* (Prosoft Learning)	10-11
			Customer Support Specialist Certification* (Help Desk Institute)	10-16
			Fundamentals of Wireless LANs Certificate*	10-21
			IC <sup>3</sup> * (Certiport)	10-24
			iNet* (CompTIA)	10-25
			International Computer Driving License* (ICDL US)	10-25
			IT Essentials Certificate, Level 1* (Cisco Systems)	10-26
			IT Essentials Certificate, Level 2* (Cisco Systems)	10-26
			Linux +* (CompTIA)	10-27
Microsoft Certified Professional (MCP)* (Microsoft)	10-29			
MOS* (Microsoft)	10-30			
Network+* (CompTIA)	10-32			
Unix Certificate* (Cisco Systems)	10-37			
Voice and Data Cabling Certificate* (Cisco Systems)	10-38			
Computer Solutions (middle school) 6609, 6610	12-1			
Database Design and Management (Oracle) 6660	2-11	2-11	IC <sup>3</sup> * (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
			MOS* (Microsoft)	10-30
			Oracle Certified Professional (Oracle)	10-33

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Advanced Database Design and Management (Oracle) 6661	2-11	2-11	Brainbench Software Development Certifications*	10-6
			Brainbench Web Administration Certifications	10-6
			IC <sup>3</sup> * (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
			Java Programming Certificate* (Cisco Systems)	10-26
			MOS* (Microsoft)	10-30
			Oracle Certified Professional (Any Oracle Professional Certification Exam*) (Oracle)	10-33
Design, Multimedia, and Web Technologies 6630	2-12	2-12	Sun Certified Programmer for Java2 Platform (Sun Microsystems)	10-37
			Adobe Certified Expert* (Adobe)	10-3
			Brainbench Software Development Certifications*	10-6
			Brainbench Web Administration Certification	10-7
			Brainbench Web Design and Development Certifications*	10-6
			Brainbench Desktop Publishing Software Certifications	10-7
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination (Prosoft Learning)	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination*	10-11
			CIW Professional* (Prosoft Learning)	10-11
			IC <sup>3</sup> * (Certiport)	10-24
			iNet* (CompTIA)	10-25
			International Computer Driving License* (ICDL US)	10-25
			Macromedia Certified Professional* (Macromedia)	10-27
			Master CIW Designer*** (Prosoft Learning)	10-28
			MOS* (Microsoft) (pass any one unique exam at the core level)	10-30
			Web Design Certificate* (Cisco Systems)	10-38
			WOW Certified Apprentice Webmaster* (World Organization of Webmasters)	10-38
			WOW Certified Web Administrator	10-39
WOW Certified Web Designer Apprentice*	10-39			
WOW Certified Web Developer Apprentice*	10-39			

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Advanced Design, Multimedia, and Web Technologies 6631	2-12	2-12	Adobe Certified Expert* (Adobe)	10-3
			Brainbench Software Development Certifications*	10-6
			Brainbench Web Administration Certification	10-7
			Brainbench Web Design and Development Certifications*	10-6
			Brainbench Desktop Publishing Software Certifications	10-7
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination (Prosoft Learning)	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination*	10-11
			CIW Professional* (Prosoft Learning)	10-11
			IC <sup>3</sup> * (Certiport)	10-24
			iNet* (CompTIA)	10-25
			International Computer Driving License* (ICDL US)	10-25
			Macromedia Certified Professional* (Macromedia)	10-27
			Master CIW Designer*** (Prosoft Learning)	10-28
			MOS* (Microsoft) (pass any one unique exam at the core level)	10-30
			Web Design Certificate* (Cisco Systems)	10-38
			WOW Certified Apprentice Webmaster* (World Organization of Webmasters)	10-38
WOW Certified Web Administrator*	10-39			
WOW Certified Web Designer Apprentice*	10-39			
WOW Certified Web Developer Apprentice*	10-39			
Digital Input Technologies 6160	2-14, 12-2	2-14		
Digital Input Technologies 6161	2-14, 12-2	2-14	MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Finance 6120	2-15	2-15	IC <sup>3</sup> * (Certiport)	10-24
			International Computer Driving License* (ICDL US)	10-25
Finance 6121	2-15	2-15		
Information Technology Fundamentals 6670	2-16	2-16	IC <sup>3</sup> * (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			IT Essentials Certificate, Level 1* (Cisco Systems)	10-26
			MOS* (Microsoft)	10-30
Keyboarding (Middle school) 6150	12-1			
Keyboarding (Secondary) 6151	2-17, 12-3	2-17		
Keyboarding Applications 6152	2-17, 12-3	2-17	MOS* (Microsoft)	10-30
Keyboarding Applications 6153	2-17, 12-3	2-17		

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Legal Systems Administration 6735	2-18	2-18	Administrative Assisting Assessment	10-2
			Certification for Legal Professionals* (ALS) when combined with Office Administration and Accounting	10-9
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Legal Systems Administration 6736	2-18	2-18		
Make It Your Business (middle school) 6110, 6111	12-2			
Medical Systems Administration 6730	2-19	2-19	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Medical Systems Administration 6731	2-19	2-19		
Notetaking 6241/6242	2-20	2-20		
Office Administration 6621	2-20	2-20	Administrative Assisting Assessment (NOCTI)	10-2
			Certification for Legal Professionals* (ALS) when combined with Legal Systems Administration and Accounting	10-9
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Office Administration 6622	2-20	2-20		
Principles of Business and Marketing 6115	2-21, 12-3	2-21	IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
Principles of Business and Marketing 6116	2-21, 12-3	2-21		
Programming 6640	2-22	2-22	Brainbench Software Development Certification (Brainbench)	10-6
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination*	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination	10-11
			CIW Professional* (Prosoft Learning)	10-11
			IC <sup>3</sup> (Certiport)	10-24
			International Computer Driving License (ICDL US)	10-25
			Microsoft Certified Professional* (Microsoft)	10-30

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Advanced Programming 6641	2-22	2-22	Brainbench Software Development Certification (Brainbench)	10-6
			CIW Associate* (Prosoft Learning)	10-10
			CIW Associate Certification: Internet Business Foundations Examination*	10-10
			CIW Associate Certification: Site Development Foundations Examination*	10-10
			CIW Associate Certification: Network Technology Foundations Examination	10-11
			CIW Professional* (Prosoft Learning)	10-11
			IC <sup>3</sup> (Certiport)	10-24
			International Computer Driving License (ICDL US)	10-25
			Java Programming Certificate (Cisco Systems)	10-26
			Microsoft Certified Professional* (Microsoft)	10-30
			Sun Certified Programmer for Java2 Platform* (Sun Microsystems)	10-37
Word Processing 6625	2-23	2-23	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Word Processing 6626	2-23	2-23		
<b>Special Programs</b>				
Office Specialist I 6740 Office Specialist II 6741 Office Specialist III 6742	2-24	2-24	Administrative Assisting Assessment (NOCTI)	10-2
			IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30
Business Individualized Program 6745	2-25			
Business and Information Technology Dual Enrollment 6810	2-25			
International Baccalaureate Business Management IB6135	2-25	2-25		
International Baccalaureate Information Technology in a Global Society IB6613	2-25	2-25	IC <sup>3</sup> Certification* (Certiport)	10-24
			International Computer Driving License (ICDL US)*	10-25
			MOS* (Microsoft) (pass any two unique MOS exams at the core level)	10-30

## Family and Consumer Sciences

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Middle School Courses</b>				
Exploring Work and Family Roles 8204/8206/8208/8241/8242/8243/8244/8245	3-2, 12-4			
GRADS 8211/8212	3-2, 12-4			
ProTeam 9060/9061	3-3, 12-6			
<b>Work Focus Courses: Secondary</b>				
Culinary Arts I 8275 Culinary Arts II 8276	3-2	3-3	ACCESS (American Culinary Foundation)	10-2
	3-3		Commercial Foods Assessment (NOCTI)	10-14
			Food Production Management and Services Assessment (NOCTI)	10-20
			ProStart National Certificate of Achievement (Educational Foundation of the National Restaurant Association)	10-35
Culinary Arts 8521/8522/8523	3-3	3-4	Retail Commercial Baking ((NOCTI)	10-36
			ACCESS (American Culinary Foundation)	10-2
			Commercial Foods Assessment (NOCTI)	10-14
			Food Production Management and Services Assessment (NOCTI)	10-20
			ProStart National Certificate of Achievement (Educational Foundation of the National Restaurant Association)	10-35
Early Childhood Education I 8285 Early Childhood Education II 8286	3-4	3-4	Retail Commercial Baking (NOCTI)	10-36
			Early Childhood Care and Education Assessment (NOCTI)	10-17
Family and Human Services I 8264 Family and Human Services II 8265	3-5	3-5		
Fashion Design I 8280 Fashion Design II 8281	3-5	3-6		
	3-6			
Hospitality Services I 8202	3-6	3-7	Hospitality Management— Food and Beverage Option Assessment (NOCTI)	10-23
			Hospitality Management— Lodging Option Assessment (NOCTI)	10-23
			Lodging Management Level 1 (AH&LA)	10-27
			START Certification (AH&LA)	10-36
Hospitality Services II 8203	3-6	3-7	Hospitality Management— Food and Beverage Option Assessment (NOCTI)	10-23
			Hospitality Management— Lodging Option Assessment (NOCTI)	10-23
			Lodging Management Level 2 (AH&LA)	10-27
			START Certification (AH&LA)	10-36
Interior Design I 8295 Interior Design II 8296	3-7	3-8		

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Other Work Focus Courses</b>				
Career Pathways (Career Exploration) Phase 1 9070 Career Pathways (Career Skills) Phase 2 9071 Career Pathways (Career Match) Phase 3 9072	3-8			
Exploring Entrepreneurship 9093	3-9	3-9		
Entrepreneurship Education 9094	3-9	3-9		
Family and Consumer Sciences Dual Enrollment—Postsecondary 8266	3-9			
GRADS Work Focus/Occupational Experience 8213	3-9			
Introduction to Leadership 9091	3-9	3-10		
Leadership Development 9092	3-10	3-10		
Teacher Cadet 9062	3-10	3-10		
<b>Transition Focus Courses: Secondary</b>				
Introduction to Culinary Arts 8249/8250	3-11	3-11		
Introduction to Early Childhood Education 8233/8234	3-11	3-12		
Introduction to Family and Human Services 8237/8238	3-12	3-12		
Introduction to Fashion Design and Marketing 8247/8248	3-13	3-13		
Introduction to Hospitality, Tourism, and Recreation 8258/8259	3-13	3-14		
Introduction to Housing, Home Furnishings, and Design 8254/8255	3-14	3-14		
Work and Family Management 8205/8282	3-15	3-15		
<b>Family Focus Courses: Secondary</b>				
Family Relations 8223/8225	3-16	3-16		
Individual Development 8209/8210	3-16	3-17		
Life Planning FCS8226/8227	3-17	3-18		
Nutrition and Wellness 8228/8229	3-19	3-19		
Parenting 8231/8232	3-19	3-20		
Resource Management 8214/8219	3-20	3-21		
<b>Other Family Focus Courses</b>				
GRADS Family Focus 8277/8278	3-21			

## Health and Medical Sciences

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Middle School Course</b>				
Health and Medical Sciences Exploratory 8370	4-2, 12-4			
<b>Introductory Course</b>				
Introduction to Health and Medical Sciences Occupations 8302	4-2	4-3		
<b>Biomedical Foundations</b>				
Biotechnology Foundations 8344 Biomedical Technician 8347	4-3	4-3		
<b>Dental Assistant</b>				
Dental Assistant I 8328	4-3	4-4		
Dental Assistant II 8329	4-4	4-4	Certified Dental Assistant: Infection Control Examination (Dental Assisting National Board)	10-9
			Certified Dental Assistant: Radiation Health & Safety Examination (Dental Assisting National Board)	10-9
			Dental Assisting Assessment (NOCTI)	10-16
			NRDA Certification (National Allied Health Registry/National Association for Health Professionals)	10-32
<b>Emergency Medical Terminology</b>				
Emergency Medical Technician Basic-I 8333	4-4	4-5		
Emergency Medical Technician Basic-II 8334	4-5	4-5	Emergency Medical Technician (Virginia Department of Health)	10-18
Emergency Medical Technician Basic-III 8335	4-5	4-5		
<b>Health Careers Cluster</b>				
Health Assistant I 8331	4-5	4-6		
Health Assistant II 8332	4-5	4-6	Nurse Aide (Virginia Board of Nursing)	10-33
			Health Assisting Assessment (NOCTI)	10-22
			Home Health Aide Assessment (NOCTI)	10-22
			Nursing Assistant Assessment (NOCTI)	10-33
			National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)	10-31
<b>Medical Assistant</b>				
Medical Assistant I 8345	4-6	4-6		
Medical Assistant II 8346	4-6	4-6	Medical Assisting Assessment (NOCTI)	10-29
			NRDA Certification (National Allied Health Registry/National Association for Health Professionals)	10-32
<b>Medical Terminology</b>				
Medical Terminology 8383	4-7	4-7		

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Nursing Assistant</b>				
Nurse Aide I 8360	4-7	4-8		
Nurse Aide II 8362	4-7	4-8	Health Assisting Assessment (NOCTI)	10-22
			Home Health Aide Assessment (NOCTI)	10-22
			Nursing Assisting Assessment ((NOCTI)	10-33
			Nurse Aide (Virginia Board of Nursing)	10-33
			National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)	10-31
<b>Pharmacy Technician</b>				
Pharmacy Technician I 8305	4-8	4-8	VA Pharmacy Technician Examination (VA Board of Pharmacy)	10-37
Pharmacy Technician II 8306	4-8	4-8	VA Pharmacy Technician Examination (VA Board of Pharmacy)	10-37
<b>Physical Therapy</b>				
Physical Therapy /Occupational Therapy 8385	4-8	4-9		
<b>Practical Nursing</b>				
Practical Nursing I 8357	4-9	4-9		
Practical Nursing II 8358	4-9	4-9	Health Assisting Assessment (NOCTI)	10-22
			Home Health Aide Assessment (NOCTI)	10-22
			Nursing Assisting Assessment ((NOCTI)	10-33
			Nurse Aide (Virginia Board of Nursing)	10-33
			National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)	10-31
Practical Nursing III 8359	4-9	4-9		
<b>Surgical Technology</b>				
Surgical Technologist I 8351	4-10	4-10		
Surgical Technologist II 8352	4-10	4-10		
<b>Veterinary Assistant</b>				
Veterinary Assistant I 8310	4-10	4-11		
Veterinary Assistant II 8311	4-10	4-11		
Veterinary Assistant III 8312	4-10	4-11		
<b>Occupational Mix (with Family and Consumer Sciences)</b>				
Home Health Aide 8364	4-11	4-11		
<b>Special Programs</b>				
Dual Enrollment with Postsecondary 8394	4-11			

## Marketing

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>General Marketing</b>				
Fundamentals of Marketing 8110	5-3	5-3		
Internet Marketing 8125	5-3	5-3	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
Introduction to Marketing 8111	5-3	5-4		
Make It Your Business 8109/8112/ 8113/8114	5-4, 12-5	5-4		
Marketing 8120/8121	5-4	5-5	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
Advanced Marketing 8130/8131	5-5	5-5	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
			Retail Trades Assessment (NOCTI)	10-36
Principles of Business and Marketing 8115/8116	5-5	5-5		
<b>Executive Marketing</b>				
Global Marketing and Commerce 8135	5-6	5-6	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
Advanced Global Marketing and Commerce 8136	5-6	5-6	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
			Retail Trades Assessment (NOCTI)	10-36
Marketing Management 8132	5-7	5-7	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Exploring Entrepreneurship 9093	5-7	5-7		
Entrepreneurship Education 9094	5-7	5-7		
<b>Apparel and Accessories Marketing</b>				
Introduction to Fashion Design and Marketing 8148/8149	5-8	5-9		
Fashion Marketing 8140/8141	5-8	5-9	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
Advanced Fashion Marketing 8145/8146	5-8	5-9	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
			Retail Trades Assessment (NOCTI)	10-36
<b>Hospitality, Tourism, and Recreation Marketing</b>				
Hotel/Motel Marketing 8160/8161	5-9	5-10	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Lodging Management Program Certification, Level 1 (AH&LA)	10-27
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
			START Certification (AH&LA)	10-36
Advanced Hotel/Motel Marketing 8162/8163	5-9	5-10	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			Lodging Management Program Certification, Level 2 (AH&LA)	10-27
			Hospitality Management—Food & Beverage Assessment (NOCTI)	10-23
			Hospitality Management—Lodging Option Assessment (NOCTI)	10-23
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
START Certification (AH&LA)	10-36			
<b>Sports, Entertainment, and Recreation Marketing</b>				
Sports, Entertainment, and Recreation Marketing 8175/8176	5-10	5-11	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Advanced Sports, Entertainment, and Recreation Marketing 8177/8178	5-10	5-11	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
<b>Travel and Tourism Marketing</b>				
Travel and Tourism Marketing 8165/8166	5-11	5-12	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
Advanced Travel and Tourism Marketing 8167/8168	5-11	5-12	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
<b>Financial Services Marketing</b>				
Financial Services Marketing 8180/8181	5-12	5-12	Fundamental Concepts of Business and Marketing Certificate (ASK Institute)	10-20
			Advanced Concepts of Business and Marketing Certificate (ASK Institute)	10-3
			National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
<b>Real Estate Marketing</b>				
Real Estate Marketing 8191	5-13	5-13	Real Estate Salesperson (Virginia Real Estate Board)	10-35
<b>Special Program</b>				
Marketing Dual Enrollment with Postsecondary 8198	5-13			

## Technology Education

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Middle School Courses</b>				
Careers and You	12-5			
Introduction to Technology 8483/8482/8484/8581	12-5			
Inventions and Innovations 8461/8464/8485	12-5			
Technological Systems 8462/8463/8486	12-6			
<b>Design and Technology</b>				
Technology Foundations 8403/8402	6-3	6-4		
Technology Transfer 8405/8404	6-3	6-4		
Technology Assessment 8407/8406	6-3	6-4		
<b>Engineering, Option 1</b>				
Introduction to Engineering 8490	6-4	6-4	Pre-Engineering/Engineering Technology Assessment (NOCTI)	10-34
Advanced Engineering 8491	6-4	6-4		
<b>Engineering, Option 2</b>				
Principles of Engineering 8441	6-5	6-5	Pre-Engineering/Engineering Technology Assessment (NOCTI)	10-34
Introduction to Engineering Design 8439	6-5	6-5		
Digital Electronics 8440	6-5	6-5	Pre-Engineering/Engineering Technology Assessment (NOCTI)	10-34
Computer Integrated Manufacturing 8442	6-5	6-5		
Engineering Design and Development 8443	6-5	6-5		
<b>Communication and Information Technology</b>				
Computer Control and Automation 8420	6-6	6-6		
Computer Control and Automation 8421	6-6	6-6	IT Essentials Certificate Level 1 (Cisco Systems)	10-26
Communication Systems 8415/8418	6-6	6-6		
Graphic Communication Systems 8458/8494	6-7	6-7		
Geospatial Technology 8423	6-7	6-7		
Imaging Technology 8455	6-7	6-8		
Video and Media Technology 8497	6-8	6-8		
<b>Control Technology</b>				
Electronic Systems I 8416/8417	6-8	6-9	A+ (CompTIA)	10-1
			A+ Operating Systems Technologies Examination (CompTIA)	10-1
			A+ Core Hardware Examination (CompTIA)	10-2
			Certified Electronics Technician Associate (ETA)	10-9
			Electronic Technology Assessment (NOCTI)	10-18
			Student Electronics Technician Certification (SET) (ETA)	10-37

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Electronic Systems II 8412	6-9	6-9	A+ (CompTIA)	10-1
			A+ Operating Systems Technologies Examination (CompTIA)	10-1
			A+ Core Hardware Examination (CompTIA)	10-2
			Certified Electronics Technician Associate (ETA)	10-9
			Electronic Technology Assessment (NOCTI)	10-18
Student Electronics Technician Certification (SET) (ETA)	10-37			
Electronics Systems III 8413	6-9	6-9	A+ (CompTIA)	10-1
			A+ Operating Systems Technologies Examination (CompTIA)	10-1
			A+ Core Hardware Examination (CompTIA)	10-2
			Certified Electronics Technician Associate (ETA)	10-9
			Electronic Technology Assessment (NOCTI)	10-18
Student Electronics Technician Certification (SET) (ETA)	10-37			
Power and Transportation 8445/8444	6-9	6-9		
Energy and Power 8448	6-9	6-9		
<b>Production Technology</b>				
Construction Technology 8431/8432	6-10	6-10		
Materials and Processes Technology 8433/8478	6-10	6-10		
Production Systems 8447/8446	6-10	6-10		
Manufacturing Systems 8425/8426	6-11	6-11	Manufacturing Technology Assessment (NOCTI)	10-28
Advanced Manufacturing Systems 8427	6-11	6-11	Manufacturing Technology Assessment (NOCTI)	10-28
Information Technology in Production Systems 8496	6-11	6-12	A+ Certification (CompTIA)	10-1
			A+ Operating Systems Technologies Examination (CompTIA)	10-1
			A+ Core Hardware Examination (CompTIA)	10-2
			IT Essentials Certificate Level 1 (Cisco Systems)	10-26
<b>Technical Design and Illustration</b>				
Technical Drawing and Design 8435/8434	6-12	6-13	AutoCAD Certifications (Brainbench)	10-4
Engineering Drawing and Design 8436/8493	6-12	6-13	AutoCAD Certifications (Brainbench)	10-4
Architectural Drawing and Design 8437/8492	6-12	6-13	AutoCAD Certifications (Brainbench)	10-4
Digital Visualization	6-13	6-13	AutoCAD Certifications (Brainbench)	10-4
<b>Principles of Technology</b>				
Principles of Technology I 9811	6-13	6-14		
Principles of Technology II 9812	6-13	6-14		
<b>Biotechnology Program</b>				
Biotechnology Foundations 8468	6-14	6-14		
Bioengineering 8467B	6-14	6-14		
<b>Other Courses</b>				
Technology Awareness 8410 (Grades K-5)	6-14			
Technology Education Dual Enrollment with Postsecondary 8498	6-14			
Technology Studies 8465	6-14			
Advanced Technology Studies 8466	6-14			

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Career and Technical Occupational Exploration –Disadvantaged 8469	6-14			
CTE Occupational Exploration Disabled—8471	6-14			
Industrial Occupational Exploration 8427	6-14			

## Trade and Industrial Education

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Communications and Graphics</b>				
Advertising Design 8570/8571/8572	7-2	7-2	Advertising Design Assessment (NOCTI)	10-3
Basic Photography 8610	7-2	7-3		
Commercial Photography 8607/8608/8609	7-3	7-3		
Computer Networking Hardware Operations I 8542	7-3	7-4	Cisco CCNA Academy Certificate Level 1	10-11
Computer Networking Hardware Operations II 8543	7-3	7-4	Cisco CCNA Academy Certificate Level 2	10-12
Computer Networking Hardware Operations III 8544	7-3	7-4	Cisco CCNA Academy Certificate Level 3	10-12
Computer Networking Hardware Operations IV 8545	7-3	7-4	Cisco CCNA Academy Certificate Level 4	10-12
			Cisco Certified Networking Associate (CCNA)	10-12
			IT Essentials Level 2 (Networking Operating Systems) (Cisco Systems)	10-26
Computer Repair and Servicing 8621 (Computer Maintenance)	7-4	7-4		
Computer Systems Technology 8622/8623/8624	7-4	7-5	A+ (CompTIA)	10-1
			A+ Certification Operating Systems Technologies Examination (CompTIA)	10-1
			A+ Certification Core Hardware Examination (CompTIA)	10-2
			Brainbench Systems Administration Certification	10-6
			Brainbench Technical Support Certification	10-6
			Certified Computer Service Technician (ETA)	10-9
			Fundamentals of Wireless LANs Certification (Cisco Systems)	10-21
			IT Essentials 1 Certificate (Cisco Systems)	10-26
Drafting 8530/8531/8532	7-5	7-5	Architectural Drafting Assessment (NOCTI)	10-4
			AutoCAD Certifications (Brainbench)	10-4
			CAD Assessment (NOCTI)	10-7
			Drafter Certification (American Design Drafting Association)	10-17
			General Drafting and Design Assessment (NOCTI)	10-21
Electronics Technology 8536/8537/8538	7-6	7-6	Certified Computer Service Technician (ETA)	10-9
			Certified Electronics Technician Associate (ETA)	10-9
			Certified Satellite Dish Installer (ETA)	10-11
			Electronics Technology Assessment (NOCTI)	10-18
			Student Electronics Technician Certification (SET) (ETA)	10-37
			Telecommunications Electronics Technician (ETA)	10-37
Graphic Imaging Technology 8660/8661/8662	7-6	7-7	Adobe Certified Expert (Adobe Systems Incorporated)	10-3
			Brainbench Desktop Publishing Software Certifications	10-7
			Graphic Communications Technology Assessment (NOCTI)	10-21
			PrintED Certification (all exams) (Graphic Arts Education and Research Foundation)	10-35

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Radio Communications 8640/8641/8642	7-7	7-7		
Robotic Workcell Technology 8557/8558/8559	7-7	7-8		
Telecommunications 8650/8651	7-8	7-8	Telecommunications Electronics Technician Certification (ETA)	10-37
Television Production 8688/8689/8690	7-8	7-8	Audio-Visual Communications Assessment (NOCTI)	10-4
			Television Broadcasting Assessment (NOCTI)	10-37
			Visual Communications Assessment (NOCTI)	10-37
<b>Construction</b>				
Basic Carpentry 8600	7-9	7-9		
Brick Layer 8549	7-9	7-9		
Building Trades 8515/8516/8517	7-9	7-10	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Carpentry Level One, National Construction Career Test (NCCER)	10-8
			Carpentry, National Construction Career Test (NCCER)	10-8
			Carpentry: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-8
			Electrical, National Construction Career Test (NCCER)	10-18
			Electrical Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-17
			House Wiring Principles: Construction Academy Examination (Thomson Delmar/Home Builders Institute)	10-24
			Masonry, National Construction Career Test (NCCER)	10-28
			Plumbing Assessment (NOCTI)	10-34
Cabinetmaking 8604/8605/8606	7-10	7-11	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Cabinetmaking Assessment (NOCTI)	10-7

<b>Course</b>	<b>Course Description Page #</b>	<b>Course Sequences Page #</b>	<b>Certification, License, Assessment Available</b>	<b>Credential Description Page #</b>
Carpentry 8601/8602/8603	7-11	7-11	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Carpentry Level One, National Construction Career Test (NCCER)	10-8
			Carpentry: Residential Construction Academy Examination (Thomson Delmas/Home Builders Institute)	10-8
			Carpentry, National Construction Career Test (NCCER)	10-8
			Carpentry Assessment (NOCTI)	10-8
Building Management 8590/8591/8592	7-12	7-12		
Electricity 8533/8534/8535	7-12	7-13	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			BICSI Registered Installer, Level 1 (BISCI/International Telecommunications Association)	10-5
			Certified Fiber Optics Installer (Association of Communications and Electronics Schools, International)	10-9
			Certified Satellite Disk Installer (ETA)	10-11
			Construction Electricity Assessment (NOCTI)	10-14
			Copper-Based Cabling Certification (RBT Systems)	10-15
			Data Cabling Installer Certification (ETA)	10-16
			Electrical Construction Assessment (NOCTI)	10-17
			Electrical Principles: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-17
			Electricity, National Construction Career Test (NCCER)	10-18
			Fiber Optic Network Cabling Certification (RBT Systems)	10-19
			Fiber Optics Installer (ETA)	10-19
			Graymark Cable Installation Certification (Graymark International)	10-21
			House Wiring: Residential Construction Academy Examination (Thomson Delmar Learning/Home/Builders Institute)	10-24
			Voice and Data Cabling Certification (Cisco Systems)	10-38

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505	7-14	7-14	Air Conditioning Certification (HVAC Excellence)	10-3
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Commercial Air Conditioning Certification (HVAC Excellence)	10-14
			Commercial Refrigeration Certification (HVAC Excellence)	10-14
			Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Electrical Certification (HVAC Excellence)	10-18
			Electric Heat Certification (HVAC Excellence)	10-18
			EPA Technician Certification (Core Exam I, II, or III) (Environmental Protection Agency)	10-19
			Gas Heat Certification (HVAC Excellence)	10-21
			Heating, Electrical, Air Conditioning Technology (HEAT) Examination (HVAC Excellence)	10-22
			Heat Pump Certification (HVAC Excellence)	10-22
			HVAC, National Construction Career Test (NCCER)	10-24
			HVAC: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-24
			Installer Core Certification (NATE)	10-25
			Light Commercial Heating & Air Conditioning (ARI)	10-26
			Oil Heat Certification (HVAC Excellence)	10-33
Residential Air-Conditioning and Heating Certification (ARI)	10-36			
Masonry 8512/8513/8514	7-15	7-15	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Construction Masonry – Blocklaying Assessment (NOCTI)	10-14
			Construction Masonry – Bricklaying Assessment (NOCTI)	10-15
Plumbing 8551/8552/8553	7-15	7-16	Masonry, National Construction Career Test (NCCER)	10-28
			Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-5
			Plumbing: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)	10-34
Utility/Heavy Construction Technology 8616/8617/8618	7-16	7-16	Plumbing Assessment (NOCTI)	10-34

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Metals</b>				
Industrial Maintenance Technology 8575/8576/8577	7-17	7-17	EPA Technician Certification (Core Exam I, II, or III) (Environmental Protection Agency)	10-19
			Industrial Maintenance Mechanic Assessment (NOCTI)	10-25
Precision Machining Technology 8539/8540/8541	7-17	7-18	Machining Skills Level 1—Drill Press (NIMS)	10-27
			Machining Skills Level 1—Milling Machine (NIMS)	10-27
			Machining Skills Level 1—Measurements, Materials, and Safety (NIMS)	10-27
			Precision Machining (NOCTI)	10-34
Sheet Metal 8663/8664/8665	7-18	7-18	Metalworking and Fabrication Assessment (NOCTI)	10-29
Welding 8672/8673/8674	7-18	7-19	Core, Introductory Craft Skills, National Construction Career Test (NCCER)	10-15
			SENSE (American Welding Society)	10-36
			Welding, National Construction Career Test (NCCER)	10-34
			Welding (NOCTI)	10-34
<b>Personal Services</b>				
Barbering 8740/8741/8742	7-19	7-19	Barbers (Virginia Board of Barbers and Cosmetology)	10-5
Beauty Salon Assistant 8610	7-19	7-19		
Commercial Sewing 8524/8525/8526	7-20	7-20		
Cosmetology 8527/8528/8529	7-20	7-20	Cosmetology (Virginia Board of Barbers and Cosmetology)	10-15
			Cosmetology (NOCTI)	10-15
Nail Technician 8692/8693	7-21	7-21	Nail Technician (Virginia Board of Barbers and Cosmetology)	10-31
<b>Protective Services</b>				
Criminal Justice 8702/8703/8704	7-21	7-21	Criminal Justice Assessment (NOCTI)	10-16
Firefighting 8705/8706/8707	7-22	7-22	Firefighter I Level 1 Certification (Virginia Department of Fire Programs)	10-19
Public Safety 8700/8701	7-22	7-22		
<b>Transportation</b>				
Aircraft Pilot Training 8731/8732	7-23	7-23		
Aviation Maintenance Technology 8728/8729	7-23	7-23		
Automotive Body Technology—Certified 8676/8677/8678	7-23	7-24	Collision Repair (NOCTI)	10-13
			Collision Repair/Refinishing Technology (NOCTI)	10-13
			Collision Repair & Refinish Test Series (any exam) (NATEF)	10-13
			Refinishing Technology Assessment (NOCTI)	10-35
Automotive Body Repair—Non-Certified 8679/8680/8681	7-24	7-24	Collision Repair (NOCTI)	10-13
			Collision Repair/Refinishing Technology (NOCTI)	10-13
			Collision Repair & Refinish Test Series (any exam) (NATEF)	10-13
			Refinishing Technology Assessment (NOCTI)	10-35
Basic Automotive Body Repair 8675	7-24	7-24		

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
Automotive Technology – Certified 8505/8506/8507	7-25	7-25	Automotive Technician (ASE)	10-5
			Automotive Youth Education Systems Exit Examinations (AYES)	10-5
			National Automotive Technicians Education Foundation End of Program Test Series Examinations (NATEF)	10-31
			Parts Specialist: Automobile or Medium/Heavy Truck (NATEF)	10-33
Automotive Servicing – Non-Certified 8710/8711/8712	7-25	7-26	Automotive Technician (ASE)	10-5
			Automotive Youth Education Systems Exit Examinations (AYES)	10-5
			National Automotive Technicians Education Foundation End of Program Test Series Examinations (NATEF)	10-31
			Parts Specialist: Automobile or Medium/Heavy Truck (NATEF)	10-33
Automotive Maintenance 8709	7-26	7-26		
Diesel Equipment Technology 8613/8614/8615	7-26	7-26	Diesel Engine Mechanics Assessment (NOCTI)	10-16
Motorsports Technology 8509/8510/8511	7-27	7-27		
Small Engine Technology 8725/8726/8727	7-27	7-27	Air Cooled Gas Engine Repair (NOCTI)	10-4
			Outdoor Power Equipment Certification (EETC)	10-33
Small Engine Repair 8724	7-27	7-28		
<b>Cooperative Education</b>				
Industrial Cooperative Training 8901/8902/8903/8904	7-28	7-28		
<b>Special Programs</b>				
Trade and Industrial Education Dual Enrollment with Postsecondary 8801	7-28			

## Career Connections

Course	Course Description Page #	Course Sequences Page #	Certification, License, Assessment Available	Credential Description Page #
<b>Education for Employment</b>				
EFE Introduction 9075/9076/9082/9083	8-1			
EFE Level 1 9077/9078/9084/9085	8-2	8-2		
EFE Level 2 9079/9080/9086/9087	8-2	8-2		
EFE Cooperative Education 9020/9021/9030/9031	8-2	8-2	National Professional Certification in Customer Service (National Retail Federation Foundation)	10-32
<b>Career Exploration and Investigation</b>				
Careers and You 8475	8-3	8-3		
Career Pathways Phase 1: Career Exploration 9070	8-3	8-3		
Career Pathways Phase 2: Career Skills 9071	8-3	8-3		
Career Pathways Phase 3: Career Match 9072	8-3	8-3		
<b>Entrepreneurship</b>				
Exploring Entrepreneurship 9093	8-4	8-4		
Entrepreneurship Education 9094	8-4	8-4		
<b>Leadership</b>				
Introduction to Leadership 9091	8-4	8-4		
Leadership Development 9092	8-4	8-4		
<b>Teacher Cadet</b>				
ProTeam 9060/9061	8-5	8-5		
Teacher Cadet 9062	8-5	8-5		





## **Section 1: Agricultural Education 2006-2007**

### **Need course information?**

- Course Descriptions
- Course Sequences
- Certifications, Licenses, and Assessments
- Career Clusters





## Section 1: Agricultural Education Course Descriptions, Sequences, Certification, Career Clusters

### Section Overview

---

This section presents course information applicable to the Agricultural Education program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The family is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career clusters, Career Areas, and Career Roles.

## Middle School Courses

---

Middle school courses are listed and described in Section 12: Career Exploration and Middle School. Middle school courses are reported in the Agricultural, Food, and Natural Resources career cluster. Completer sequences and certifications do not apply.

Course Title and Code	Section 12 Page
• Introduction to Agriscience 8002	12-1
• Agriscience Exploration 8003	12-1
• Agriscience and Technology	12-2

## High School Course Credit in Middle School

---

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. Agricultural Education courses that may be offered in middle school are

- Agricultural Mechanics and Basic Plant Science 8006
- Agricultural Mechanics and Basic Animal Science 8008.

## Fundamental Courses

---

### Agricultural Mechanics and Basic Plant Science (Level I) 8006

**Grade Level:** 8 or 9 (suggested) (36 weeks, single period)

Approximately one-half of this course is devoted to agricultural mechanics, with emphasis placed on skill development in basic metals, tool fitting and cold metals, basic arc welding, sheet metal, soldering and brazing, plan reading and sketching, and hand woodworking. The remainder of the course emphasizes the development of competencies in plant sciences, rural and urban living, leadership, and resource conservation.

**Note 1:** This course may be offered on the middle school level for high school credit. It is reported under the Agriculture, Food, and Natural Resources family.

**Note 2:** This Level I course is recommended as an introduction to Level III, IV, and V courses related to plant science, production, and marketing and counts toward a concentration or specialization sequence.

### **Agricultural Mechanics and Basic Animal Science (Level II) 8008**

**Grade Level:** 9 or 10 (suggested) (36 weeks, single period)

Students continue to learn agricultural mechanics, with emphasis placed on fundamentals of electricity, arc welding, gas cutting and welding, small engines, power woodworking, and wood and metal preservatives. They also receive instruction in animal science and further develop competencies in rural and urban living, leadership, and resource conservation.

**Note 1:** This course may be offered in middle school for high school credit. It is reported under the Agriculture, Food, and Natural Resources family.

**Note 2:** This Level I course is recommended as an introduction to Level III, IV, and V courses related to animal science, production, and marketing and counts toward a concentration or specialization sequence.

## **Agricultural Business**

---

### **Agricultural Business Fundamentals (III) 8022**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Students develop the necessary knowledge, skills, habits, and attitudes for employment in off-farm agricultural businesses. Where training centers are available, cooperative arrangements with local agricultural businesses provide occupational experiences for students. When training centers are not available, simulated experiences may be provided. Leadership training is provided through the FFA.

### **Agricultural Business Operations (IV) 8024**

**Grade Level:** 11 or 12 (suggested) (36 weeks)

Wherever possible, students participate in cooperative on-the-job training programs with local agricultural businesses. The curriculum emphasizes off-farm agricultural occupations, business procedures, merchandising, marketing, and agricultural business management. Instruction is provided in agricultural product knowledge, agricultural mechanics, plant science, and leadership development.

### **Agricultural Business Management (V) 8026**

**Grade Level:** 12 (suggested) (36 weeks)

This occupational preparation course should be operated on a cooperative on-the-job training basis with local agricultural businesses. Much of the instruction may be individualized. The course provides further opportunities for the development of business procedures, management techniques, and agricultural product knowledge. Leadership skills continue to be developed.

<b>Concentration Sequences</b>	<b>Specialization Sequences</b>	<b>Certification/License/Assessment Available</b>	<b>Career Cluster</b>
Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> one of the following: <ul style="list-style-type: none"><li>• Agricultural Business Fundamentals 8022</li><li>• Agricultural Business Operations 8024</li></ul>	Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> two courses in the Agricultural Business sequence	N/A	Agriculture, Food, and Natural Resources
Two courses in the Agricultural Business sequence or equivalent	The <b>Agricultural Business sequence:</b> <ul style="list-style-type: none"><li>• Agricultural Business Fundamentals 8022</li><li>• Agricultural Business Operations 8024</li><li>• Agricultural Business Management 8026</li></ul>		

## **Agricultural Power**

---

### **Introduction to Power, Structural, and Technical Systems 8016**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Throughout this introductory level Agricultural Power course, students will receive instruction in the areas of basic engines principles, powertrains, hydraulics and electrical systems. The course will also address the areas of building structures, metal fabrication and precision agricultural management..

Related Certification: Outdoor Power Equipment Certification, Agricultural Mechanics Assessment

### **Agricultural Structural Systems 8017**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Instruction in agricultural structural systems will provide students with the knowledge and skills necessary to consider a career in constructing agricultural and building systems. Instruction will focus on the specific components of building systems and on developing leadership and career skills.

### **Agricultural Power Systems 8018**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Instruction in agricultural power systems will focus on increasing the depth of study in power, structural, and technical systems. Areas of these systems to be addressed are engines, powertrains, hydraulics, electrical, and fuels. Instruction will also be provided in precision measurement, leadership and career skills.

Related Certification: Agricultural Mechanics Assessment

### **Agricultural Fabrication and Emerging Technologies 8019**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Students will receive instruction providing career training in the areas of agricultural fabrication and emerging technologies. The course content will focus on hot and cold metal fabrication and will also include studies of emerging technologies utilized within the field of agriculture

### **Advanced Agricultural Power Systems 8020**

**Grade Level:** 11 or 12 (suggested) (36 weeks)

Students enrolled in this advanced course of study will be instructed in detailed maintenance, troubleshooting and repair of agricultural equipment systems and components. Advanced instruction will also be given in the administrative and clerical areas of operating an agricultural equipment sales and or repair business.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Introduction to Power, Structural, and Technical Systems 8016 <b>OR</b> <ul style="list-style-type: none"> <li>• Introduction to Power, Structure, and Technical Systems 8016</li> <li>• Agricultural Structural Systems 8017</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>• Introduction to Power, Structural, and Technical Systems 8016</li> <li>• Agricultural Fabrication and Emerging Technologies 8019</li> </ul>	Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> <ul style="list-style-type: none"> <li>• Introduction to Power, Structural, and Technical Systems 8016</li> <li>• Agricultural Power Systems 8018</li> <li>• Advanced Agricultural Power Systems 8020</li> </ul>	Available upon completion of Introduction to Power, Structural, and Technical Systems <ul style="list-style-type: none"> <li>• Outdoor Power Equipment Certifications (EETC)</li> <li>• Agricultural Mechanics Assessment (NOCTI)</li> </ul> Available upon completion of Agricultural Mechanization Sales and Service: <ul style="list-style-type: none"> <li>• Agricultural Mechanics Assessment (NOCTI)</li> </ul>	Agriculture, Food, and Natural Resources

## **Agricultural Production**

---

### **Agricultural Production Technology (III) 8010**

**Grade Level:** 10 or 11 (suggested) (36 weeks)

This course emphasizes one or more areas of plant science, animal science, soil science, agricultural business management, and agricultural mechanization, based upon the student's employment objective. Supervised occupational experience programs and leadership training are important parts of the course. When only single periods are provided, greater emphasis is placed on individualized instruction and supervised occupational experience programs.

### **Agricultural Production Management (IV) 8012**

**Grade Level:** 11 or 12 (suggested) (36 weeks)

Course includes instruction in agricultural mechanics, with emphasis placed on the application of mechanical skills to farm power and machinery, soil and water management, supervised farming programs, and leadership training.

### **Operating the Farm Business (V) 8014**

**Grade Level:** 12 (suggested) (36 weeks)

Much of the content in this occupational preparation course may be provided through individualized instruction. Students focus on farming, farm management, and occupational experience as they receive instruction in adjusting, operating, and maintaining farm machinery and equipment and in planning and constructing farm buildings and facilities. Continued emphasis is placed on leadership training.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 and one of the following: <ul style="list-style-type: none"> <li>• Agricultural Production Technology 8010</li> <li>• Agricultural Production Management 8012</li> </ul>	Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 and two or more of the courses in the Agricultural Production sequence	Available upon completion of Agricultural Production Technology or Agricultural Production Management: <ul style="list-style-type: none"> <li>• Commercial Pesticide Applicator Certification (VA Dept. of Agriculture and Consumer Services)</li> <li>• Production Agriculture Assessment (NOCTI)</li> </ul>	Agriculture, Food, and Natural Resources
	<b>The Agricultural Production sequence:</b> <ul style="list-style-type: none"> <li>• Agricultural Production Technology 8010</li> <li>• Agricultural Production Management 8012</li> <li>• Operating the Farm Business 8014</li> </ul>		
Two of the courses in the Agricultural Production sequence	Additional courses available for specialization: <ul style="list-style-type: none"> <li>• Agricultural Production Technology 8010</li> <li>• Agricultural Production Management 8012</li> <li>• Operating the Farm Business 8014</li> <li>• Equine Management 8080</li> <li>• Small Animal Care I 8083</li> <li>• Horticulture Sciences 8034</li> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Landscaping 8036</li> <li>• Floriculture 8038</li> <li>• Turf Establishment and Maintenance 8051</li> <li>• Advanced Turf Grass Applications 8054</li> </ul>		

## Natural Resources Management

### Introduction to Natural Resources (III) 8040

**Grade Level:** 10 or 11 (suggested) (36 weeks)

Students develop knowledge and skills required for employment in occupations related to forestry and wildlife management; outdoor recreation; and air, soil, and water conservation. Because of the emphasis on different facets of natural resources management in different parts of the state, the course varies to meet local needs and interests.

### Forestry, Wildlife, and Soil Management (IV) 8042

**Grade Level:** 11 or 12 (suggested) (36 weeks)

This course includes instruction in forest protection and harvesting, fish pond ecology and management, planning and operation of a hunting and fishing preserve, wildlife ecology and management, soil and water management systems, service and operation of large power equipment, and leadership training.

### Natural Resources Business Management (V) 8044

**Grade Level:** 12 (suggested) (36 weeks)

Much of the instruction in this course may be individualized. Major learning areas include processing forest products, lumber grading, and determining the feasibility of establishing, financing, and managing a business such as forestry, outdoor recreation, wildlife, or urban conservation. Based upon interests, students may receive instruction in developing and operating campgrounds, hiking and riding trails, riding stables, marinas, vacation farms, and farm ponds. Operation and maintenance of equipment is also emphasized. Leadership training is an important area of instruction.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 and one of the following: <ul style="list-style-type: none"> <li>• Introduction to Natural Resources 8040</li> <li>• Forestry, Wildlife, and Soil Management 8042</li> <li>• Ecology and Environmental Management 8046</li> </ul>	Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 and two or more of the courses in the Natural Resource Management sequence	Available upon completion of Introduction to Natural Resources or Forestry, Wildlife, and Soil Management: <ul style="list-style-type: none"> <li>• Forestry Products and Processing Assessment (NOCTI)</li> </ul> Available upon completion of any Natural Resources Management course: <ul style="list-style-type: none"> <li>• Commercial Pesticide Applicator Certification Examinations (VA Dept. of Agriculture and Consumer Services)</li> </ul>	Agriculture, Food, and Natural Resources
Two courses in the Natural Resource Management sequence	The <b>Natural Resource Management sequence:</b> <ul style="list-style-type: none"> <li>• Introduction to Natural Resources 8040</li> <li>• Forestry, Wildlife, and Soil Management 8042</li> <li>• Natural Resources Business Management 8044</li> </ul> Additional choices for specialization: <ul style="list-style-type: none"> <li>• Ecology and Environmental Management 8046</li> <li>• Ecology and Environmental Management 8045</li> </ul>		

## Horticulture

### Horticulture Sciences 8034

**Grade Level:** 11 or 12 (suggested) (36 weeks)

In this course, students develop the necessary knowledge, skills, habits, and attitudes for entry-level employment and advancement in areas such as floriculture, landscape design, greenhouse operation, nursery plant production, and turf management. They receive instruction in using soil and other plant-growing media and in identifying, propagating, and growing horticultural plants in the greenhouse and land laboratory. Instruction is provided in safety practices and leadership development.

### Floral Design I 8055

**Grade Level:** 11 or 12 (suggested) (36 weeks)

**Prerequisite:** Horticultural Sciences 8034

This course offers an expanded study of floral design, which was begun in the Horticulture Sciences course. Course content covers career opportunities, floral design foundations, design applications, and the marketing of floral products. Specific design styles to be examined include mass, mass-line, line, vase, wedding, balloon, holiday, and personal-adornment arrangements. The course also emphasizes leadership activities and opportunities to participate in FFA events.

### Floral Design II 8056

**Grade Level:** 11 or 12 (suggested) (36 weeks)

**Prerequisite:** Floral Design I 8055

Course content covers a wide range of specialty floral designs, including historical designs, contemporary designs, oriental designs, seasonal designs, floragraphy, and designs for dried arrangements, novelty pieces, special events, and sympathy work. The business aspect of the industry is addressed through the study of pricing, advertising, shop design, wire services, delivery processes, professional organizations, sales techniques, and continuing education. The course emphasizes leadership activities and opportunities to participate in FFA events.

**Floriculture 8038**

**Grade Level:** 11 or 12 suggested (36 weeks)

**Prerequisite:** Horticulture Sciences 8034

Students learn the basics of the horticulture plant production industry. Instruction includes the science of plant production as well as marketing and business management. Plant material identification and floral design round out this course to prepare the student for an entry-level position in the floriculture industry. Participation in FFA activities provides leadership development opportunities.

**Greenhouse Plant Production and Management 8035**

**Grade Level:** 11 or 12 suggested (36 weeks)

**Prerequisite:** Horticulture Sciences 8034

Students enrolled in this course learn the operating procedures for a greenhouse. Units of instruction include developing plant production facilities, science application in plant production, and identification of plants. Business management and marketing skills are emphasized to prepare students for careers in the greenhouse plant production and management industry. Leadership development is offered through participation in FFA.

**Landscaping 8036**

**Grade Level:** 11 or 12 suggested (36 weeks)

**Prerequisite:** Horticulture Sciences 8034

In this course, students develop the necessary knowledge, skills, habits, and attitudes for entry-level employment and advancement in areas such as landscape design, landscape construction, and landscape maintenance. They receive instruction in sketching and drawing, analyzing a landscape site, designing for function and aesthetics, identifying and selecting landscape plants, purchasing and installing plants, and maintaining the landscape by watering, fertilizing, mulching, pruning, and controlling pests.

**Specialty Horticulture Arts 8037**

**Grade Level:** 11 or 12 (suggested (36 weeks)

**Prerequisite:** Horticultural Sciences (8034)

This course covers a wide range of specialty topics, including topiary, fruit and vegetable production, interior plantscaping, terrariums, dish gardens, bonsai, container gardens, heirloom plants, container water gardens, bulb forcing, and hydroponics. Further study is devoted to gardens that are centered on such themes as healing, wildlife, fragrance, and handicapped accessibility. Entrepreneurial business and continuing education opportunities are also addressed. The course emphasizes leadership activities and opportunities for participate in FFA events.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
<p>Horticulture Sciences 8034 <b>and</b> one of the following:</p> <ul style="list-style-type: none"> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Landscaping 8036</li> <li>• Floriculture 8038</li> <li>• Floral Design I 8055</li> <li>• Specialty Horticulture Arts 8037</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Agricultural Mechanics and Basic Plant Science 8006</li> <li>• Horticulture Sciences 8034</li> </ul>	<p>Horticulture Sciences 8034 <b>and</b> two of the following:</p> <ul style="list-style-type: none"> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Landscaping 8036</li> <li>• Floriculture 8038</li> <li>• Floral Design I 8055</li> <li>• Floral Design II 8056</li> <li>• Specialty Horticulture Arts 8037</li> </ul>	<p>Available upon completion of any horticulture course except Landscaping:</p> <ul style="list-style-type: none"> <li>• Greenhouse Operators Certification Program (Southeast Greenhouse Growers Association/ Virginia Flower Growers Association)</li> </ul> <p>Available upon completion of Horticulture Sciences 8034 <b>or</b> Floriculture 8038:</p> <ul style="list-style-type: none"> <li>• Floriculture—Greenhouse Assessment (NOCTI)</li> <li>• Horticulture—Floriculture Assessment (NOCTI)</li> </ul> <p>Available upon completion of Horticulture Sciences 8034 <b>or</b> Landscaping 8036:</p> <ul style="list-style-type: none"> <li>• Horticulture—Landscaping Assessment (NOCTI)</li> </ul> <p>Available upon completion of Horticulture Sciences 8034 <b>or</b> Greenhouse Plant Production and Management 8035:</p> <ul style="list-style-type: none"> <li>• Horticulture—Olericulture (NOCTI)</li> </ul> <p>Available upon completion of Horticulture Sciences 8034, Floriculture 8038, Landscaping, <b>or</b> Greenhouse Plant Production and Management 8035:</p> <ul style="list-style-type: none"> <li>• Commercial Pesticide Applicator Certification Examinations (VA Dept. of Agriculture and Consumer Services)</li> </ul>	<p>Agriculture and Natural Resources</p>

## Biotechnology Program

### Biotechnology Foundations 8085

**Grade Level:** 10 or 11

This course focuses on various techniques that are used to modify living organisms, or parts of organisms, to improve plants and animals, and the development of microorganisms for specific purposes. Student activities range from bioprocessing and genetic engineering to biomedicine, biomedical systems, and the environment. Students gain insight and understanding of biotechnology career fields.

### Biotechnology Applications in Agriculture 8087

**Grade Level:** 11 or 12

**Prerequisite:** Biotechnology Foundations 8085

This course enables students to understand the uses of biotechnology in the fields of plant and animal agriculture, the environment, and food science. Students develop occupational skills in agricultural biotechnology. Students have opportunities to apply the skills and concepts needed for careers in biotechnology. The course provides students with the knowledge to make balanced judgments regarding the benefits and concerns posed by agricultural biotechnology. The students are involved in many research and application activities.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Biotechnology Foundations 8085 <b>and</b> Biotechnology Applications in Agriculture 8087	Biotechnology Foundations 8085 <b>and</b> Biotechnology Applications in Agriculture 8087 <b>and</b> one additional course that addresses plant or animal science.	N/A	Agriculture, Food, and Natural Resources

### Specialized Courses

#### Applied Agricultural Concepts 8072

**Grade Level:** 9-12 (18 weeks)

#### Applied Agricultural Concepts 8073

**Grade Level:** 9-12 (36 weeks)

Students who have limited or no agricultural background or experience learn fundamental agricultural competencies needed for rural or urban living. Areas of instruction include meat grading and selection; maintenance of home appliances and equipment; and the study of plumbing, electrical wiring, and carpentry fundamentals. Teachers may incorporate additional competencies in the study of soil fertility and in cultural practices for shrubs, lawns, gardens, and fruit trees. The course emphasizes leadership development activities and participation in FFA activities.

Note: Specialized courses may substitute in a program if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Applied Agricultural Concepts 8073	Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Applied Agricultural Concepts 8073 <b>and</b> One 36-week or two 18-week courses within the Agriculture, Food, and Natural Resources career cluster.	N/A	Agriculture, Food, and Natural Resources

### Biological Applications in Agriculture 8086

**Grade Level:** 9-12 (36 weeks)

This course is designed to integrate science and agriculture in the Agricultural Education classroom. Students explore the world of agriculture and the biological principles associated with it. Competencies emphasize and reinforce standards of learning for biology with agricultural applications. Localities may substitute certain course competencies to facilitate the use of laboratory facilities. Approval can be requested from the Virginia Department of Education for science credit.

Note: Specialized courses may substitute in a program if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Biological Applications in Agriculture 8086	Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Biological Applications in Agriculture <b>and</b> One 36-week or two 18-week courses that relate to plant or animal science	N/A	Agriculture, Food, and Natural Resources

### Ecology and Environmental Management 8045

**Grade Level:** 9-12 (18 weeks)

### Ecology and Environmental Management 8046

**Grade Level:** 9-12 (36 weeks)

Students develop conservation competencies and skills through the understanding of environmental concerns. Instructional content includes the care, management, and preservation of soil, air, water, and wildlife. Students identify and discuss prevalent environmental problems and learn methods and practices used to preserve natural resources and maintain a healthy ecology. Teachers incorporate specific environmental concerns and issues common to the local school community. The course emphasizes leadership activities and opportunities to participate in FFA functions.

Note: Specialized courses may substitute in a program if approved by the local school division

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Ecology and Environmental Management 8046	Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> <ul style="list-style-type: none"> <li>• Introduction to Natural Resources 8040</li> <li>• Ecology and Environmental Management 8046</li> </ul>	N/A	Agriculture, Food, and Natural Resources

**Equine Management and Production 8015****Grade Level:** 9-12 (18 weeks)**Equine Management and Production 8080****Grade Level:** 9-12 (36 weeks)

In this course, students learn how to care for and manage horses. Equine health, nutrition, management, reproduction, training, evaluation, and showmanship are the major instructional areas. In addition, course content includes instruction in the tools, equipment, and facilities for equine enterprises. Business management topics include the economics of boarding, training, and merchandising horses. Leadership development activities are included, and participation in FFA activities is encouraged.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Equine Management and Production 8080	Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> <ul style="list-style-type: none"> <li>• Agricultural Production 8010</li> <li>• Equine Management and Production 8080</li> </ul>	N/A	Agriculture, Food, and Natural Resources

**Small Animal Care I 8083****Grade Level:** 8-12 (18/36 weeks)**Small Animal Care II 8084****Grade Level:** 8-12 (18/36 weeks)

Students learn how to care and manage small animals, focusing on instructional areas in animal health, nutrition, management, reproduction, evaluation, training, and, when applicable, showmanship. Course content also includes instruction in the tools, equipment, and facilities for small animal care and provides activities to foster business management and leadership development. FFA activities are included.

Note: Specialized courses may substitute in a program if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
<ul style="list-style-type: none"> <li>• Small Animal Care 8083 I (36 weeks)</li> <li>• Small Animal Care 8084 II (36weeks)</li> </ul>	<ul style="list-style-type: none"> <li>• Small Animal Care I 8083 (36 weeks)</li> <li>• Small Animal Care II 8084 (36 weeks)</li> <li>• Veterinary Science 8088</li> </ul>	N/A	Agriculture, Food, and Natural Resources

**Veterinary Science 8088****Grade Level:** 11 or 12 (36 weeks)

This course provides students with the employability and technical skills needed to succeed in postsecondary education and a career in veterinary medicine or in a related occupation. Course content will include the integration of academics and career skills and instruction in the use of tools, equipment, and facilities for veterinary medicine. Business management, leadership and FFA activities are included in the course. Students enrolled in the course should have a strong background in math and science and a knowledge of small animal care.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Animal Science 8008 <b>or</b> Small Animal Care 8083 <b>and</b> <ul style="list-style-type: none"> <li>• Veterinary Science 8088</li> </ul>	<ul style="list-style-type: none"> <li>• Small Animal Care I 8083 (36 weeks)</li> <li>• Small Animal Care II 8084 (36 weeks)</li> <li>• Veterinary Science 8088</li> </ul>	N/A	Agriculture, Food, and Natural Resources

**Small Engine Repair 8021****Grade Level:** 9-12 (18 weeks)**Small Engine Repair 8082****Grade Level:** 9-12 (36 weeks)

This course offers an intensive study of the operation, maintenance, and repair of small gasoline and diesel engines. Instructional topics include principles of operation of gasoline and diesel engines, tune-up and maintenance procedures, and disassembly, overhaul, and reassembly. Instruction may also include the operation of two cycle and four-cycle engines commonly found on lawn mowers, garden tractors, snow blowers, rotary tillers, chainsaws, and other equipment. The course emphasizes leadership activities and opportunities to participate in FFA functions.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Small Engine Repair 8082	Agricultural Mechanics and Basic Plant Science 8006 <b>or</b> Agricultural Mechanics and Basic Animal Science 8008 <b>and</b> Small Engine Repair 8082 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Entrepreneurship Education CCN9094</li> <li>• Internship (course code to be determined)</li> <li>• Small Engine Repair 8724</li> </ul>	Available upon completion of Small Engine Repair 8082: <ul style="list-style-type: none"> <li>• Outdoor Power Equipment Certifications (pass any one Outdoor Power Equipment Test) (Equipment and Engine Training Council)</li> <li>• Air-Cooled Gas Engine Assessment (NOCTI)</li> </ul>	Agriculture, Food, and Natural Resources

**Turf Establishment and Maintenance 8051****Grade Level:** 10 or 11 (suggested) (36 weeks)

Students begin to master the duties and tasks of professionals who establish and maintain turf in public areas such as golf courses; parks; athletic fields; school, industrial, and institutional campuses; and residential lawns.

Note: Specialized courses may substitute in a program if approved by the local school division.

**Advanced Turf Grass Applications 8054****Grade Level:** 11 or 12**Prerequisite:** Turf Establishment and Maintenance

Students continue to study the duties and tasks of professionals who establish and maintain turf in public areas such as golf courses; parks; athletic fields; school, industrial, and institutional campuses; and residential lawns.

Note: Specialized courses may substitute in a program if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career cluster
Agricultural Mechanics and Basic Plant Science 8006 <b>and</b> Turf Establishment and Maintenance 8051	Agricultural Mechanics and Basic Plant Science 8006 <b>and</b> <ul style="list-style-type: none"> <li>• Turf Establishment and Maintenance 8051</li> <li>• Advanced Turf Grass Applications 8054</li> </ul>	Available upon completion of Turf Establishment and Maintenance 8051 or Advanced Turf Grass Applications 8054: <ul style="list-style-type: none"> <li>• Commercial Pesticide Applicator Certification Examination (VA Department of Agriculture and Consumer Services)</li> </ul>	Agriculture, Food, and Natural Resources

### **Farm Equipment Operator 8052**

**Grade Level:** 12 (suggested) (36 weeks)

This helps high school seniors acquire job-entry skills as operators of farm equipment. Instruction includes units on the safe operation and preventative maintenance of equipment used in planting, cultivating, fertilizing, dusting, spraying, and harvesting crops. Cooperative education is recommended as a part of this course.

Note: Specialized courses may substitute in a program if approved by the local school division.

<b>Concentration Sequences</b>	<b>Specialization Sequences</b>	<b>Certification/License/Assessment Available</b>	<b>Career cluster</b>
Agricultural Mechanics and Basic Plant Science 8006 or Agricultural Mechanics and Basic Animal Science 8008 and Farm Equipment Operator 8052	N/A	N/A	Agriculture, Food, and Natural Resources

### **Introduction to Leadership 9091**

**Grade Level:** 9 or 10 (18 weeks)

This course equips students with individual and group leadership skills. Course content includes leadership principles, officer training, parliamentary law, public speaking, effective communication, positive public relations skills, and techniques of organizing and conducting group meetings and activities. Students are encouraged to be active members of a community or school organization.

### **Leadership Development 9092**

**Grade Level:** 11 or 12 (18 to 36 weeks)

Students develop competencies in identifying individual aptitudes in relation to effective leadership skills, understanding organizational behavior, using effective communication in the workplace, handling human resources and organizational problems, supervising and training employees, resolving conflict, and planning for the future. Continuing education in leadership is emphasized as well as practical leadership experiences in cooperation with school and community leaders.

<b>Concentration Sequences</b>	<b>Specialization Sequences</b>	<b>Career cluster</b>
Leadership courses can be combined with appropriate Agricultural Education courses for a CTE program mix. However, leadership courses do not count toward a concentration.	Leadership courses can be combined with Agricultural Education courses for a CTE program mix. However, leadership courses do not count toward a specialization.	Education and Training

## **Courses for Special Populations**

---

### **Agricultural Education for the Disabled 8050**

### **Agricultural Education for the Disadvantaged 8053**

### **General Mechanics for the Disadvantaged 8070**

### **Agricultural Education Dual Enrollment with Postsecondary 8095**

For information, please contact the Agricultural Education Service, Virginia Department of Education



## **Section 2: Business and Information Technology 2006-2007**

### **Need course information?**

- Course Descriptions
- Course Sequences
- Certifications, Licenses, and Assessments
- Career Clusters





## Section 2: Business and Information Technology Course Descriptions, Sequences, Certifications, Career Clusters

### Foundation Courses

---

Foundation courses are listed and described in Section 12: Career Exploration and Middle School:

Course Title and Code	Section 12 Page
• Computer Solutions 6609, 6610	12-1
• Keyboarding 6150	12-1
• Make It Your Business 6110, 6111	12-2

Six courses that formerly were classified as foundation programs are now categorized as *occupational*. Their descriptions, sequences, related industry certifications, and career cluster information are described in this section. Because these courses may also be taught in middle school, they are included in Section 12 as well.

Course Title and Code	Section 2 Page	Section 12 Page
• Computer Applications 6611, 6617	2-6	12-2
• Digital Input Technologies 6160, 6161	2-14	12-2
• Information Technology Fundamentals 6670	2-16	12-3
• Keyboarding 6151	2-17	12-3
• Keyboarding Applications 6152, 6153	2-17	12-3
• Principles of Business and Marketing 6115, 6116	2-21	12-3

### Section Overview

---

This section presents course information applicable to the Business and Information Technology program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career families. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

### **Certifications/Licenses/Assessments Available**

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

**Note:** In the charts that follow course descriptions, information technology certifications may be designated as follows:

\*Considered an entry-level certification

\*\*Considered a mid-level certification; may require significant curriculum mapping

\*\*\*Considered an advanced-level certification; will need to be mapped to curriculum at the academy level

### **Career Clusters**

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

**Section Overview Note:** Information on dual enrollment and International Baccalaureate Business Courses is shown at the end of this section on page 2-23.

## Occupational Courses

### Accounting 6320

**Grade Levels:** 10, 11, 12 (36 weeks)

**Prerequisite:** Keyboarding\* is recommended.

Students study the basic principles, concepts, and practices of the accounting cycle. Students learn fundamental accounting procedures using a manual and an electronic system.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

### Advanced Accounting 6321

**Grade Levels:** 11, 12 (36 weeks)

**Prerequisite:** Accounting

Students gain in-depth knowledge of accounting procedures and techniques used to solve business problems and make financial decisions. Students use accounting and spreadsheet software to analyze and interpret business applications.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Accounting 6320 <b>and</b> a combination of one or more of the following 18-week or 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Advanced Accounting 6321</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/ 6615* (requires CIS prerequisite)</li> <li>• Finance 6120/6121*</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Notetaking 6241/6242* (may complement sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> *18-week course	Accounting 6320 <b>and</b> a combination of 18-week <b>and</b> 36-week courses listed for concentration, equivalent to a total of three 36-week courses	Available on completion of Accounting or Advanced Accounting: <ul style="list-style-type: none"> <li>• Accounting—Basic Assessment (NOCTI)</li> <li>• Accounting—Complete Assessment (NOCTI)</li> <li>• Certification for Legal Professionals (ALS) when combined with Office Administration and Legal Systems Administration (Association for Legal Professionals)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	Business, Management, and Administration

**Business Law 6131****Grade Levels:** 10, 11, 12 (36 weeks)**Business Law 6132****Grade Levels:** 10, 11, 12 (18 weeks)

Students examine the foundations of the American legal system. Students explore economic and social concepts as they relate to legal principles and to business and personal laws.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Business Law 6131, 6132* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> <p><i>*18-week course</i></p>	<p>Business Law 6131/6132* <b>and</b> a combination of 18-week or 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p><i>*18-week course</i></p>	<p>Available upon completion of Business Law 6131:</p> <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	<p>Business, Management, and Administration</p>

**Business Management 6135****Grade Levels:** 10, 11, 12 (36 weeks)**Business Management 6136****Grade Levels:** 10, 11, 12 (18 weeks)

Students study basic management concepts and leadership styles as they explore business ownership, planning, operations, marketing, finance, economics, communications, the global marketplace, and human relations. Quality concepts, project management, problem solving, and ethical decision making are an integral part of the course. Student leadership skills may be enhanced by participation in school-based or virtual enterprises, job shadowing, internships, cooperative education, and/or the Future Business Leaders of America (FBLA).

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Business Management 6135/6136* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> *18-week course	Business Management 6135/6136* <b>and</b> a combination of 18-week or 36-week courses listed for concentration, equivalent to a total of three 36-week courses *18-week course	Available upon completion of Business Management 6135: <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	Business, Management, and Administration

**Computer Applications 6611**

**Grade Levels:** 7, 8, 9, 10 (36 weeks)

**Computer Applications 6617**

**Grade Levels:** 7, 8, 9, 10 (18weeks)

**Prerequisite:** Keyboarding\* is recommended.

Students develop or review correct keyboarding techniques and gain a basic knowledge of word processing, spreadsheet, database, graphics, and telecommunications applications. Students demonstrate an understanding of computer concepts through application of knowledge. Students learn to use software packages and local and worldwide network communications systems. Grade 8 Computer/Technology Standards of Learning are incorporated and reinforced in this course.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Computer Applications 6611/6617* <b>and</b> a combination of one or more of the following 18-week or 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting BUS 6321 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Computer Network Software Operations (CNSO) 6650</li> <li>• Advanced Computer Network Software Operations 6651 (requires CNSO prerequisite)</li> <li>• Database Design and Management (DDM) 6660</li> <li>• Advanced Database Design and Management 6661 (requires DDM prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Information Technology Fundamentals 6670</li> <li>• International Baccalaureate Information Technology in a Global Society 6613</li> <li>• Keyboarding 6151*</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/6116*</li> <li>• Programming 6640</li> </ul> <p><b>(Continued on next page)</b></p>	<p>Computer Applications 6611/*6617 <b>and</b> a combination of 18-week or 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p><i>*18-week course</i></p>	<p>Available upon completion of Computer Applications 6611:</p> <ul style="list-style-type: none"> <li>• Administrative Assisting Assessment (NOCTI)</li> <li>• MOS (Microsoft Office Specialist)* (Microsoft) (Pass any one unique MOS exam at the core level)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	<p>Information Technology</p>

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Advanced Programming 6641 (requires Programming prerequisite)</li> <li>Word Processing 6625/6626</li> </ul> <i>*18-week course</i>			

**Computer Information Systems 6612**

**Grade Levels:** 10, 11, 12 (36 weeks)

**Computer Information Systems 6614**

**Grade Levels:** 10, 11, 12 (18 weeks)

**Prerequisite:** Keyboarding\*

Students apply problem-solving skills to real-life situations through word processing, spreadsheets, databases, multimedia presentations, and integrated software activities. Students work individually and in groups to explore computer concepts, operating systems, networks, telecommunications, and emerging technologies. Completion of this course may prepare students for industry certifications.

\*Keyboarding course(s) or teacher-approved, demonstrated and documented touch keyboarding skills

**Advanced Computer Information Systems 6613**

**Grade Levels:** 10, 11, 12 (36 weeks)

**Advanced Computer Information Systems 6615**

**Grade Levels:** 10, 11, 12 (18 weeks)

**Prerequisite:** Computer Information Systems

Students apply problem-solving skills to real-life situations through advanced integrated software applications, including printed, electronic, and Web publications. Students work individually and in groups to explore advanced computer maintenance activities, web site development, programming, networking, emerging technology, and employability skills. Completion of this course may prepare the student for industry certifications.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Computer Information Systems 6612/6614* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses <ul style="list-style-type: none"> <li>Advanced Computer Information Systems 6613/ 6615*</li> <li>Accounting 6320</li> <li>Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>Business Law 6131/6132*</li> <li>Business Management 6135/6136*</li> <li>Computer Applications 6611/6617*</li> <li>Computer Network Software Operations (CNSO) 6650</li> <li>Advanced Computer Network Software Operations 6651 (requires CNSO prerequisite)</li> <li>Database Design and Management (DDM) 6660</li> <li>Advanced Database Design and Management 6661 (requires DDM prerequisite)</li> <li>Design, Multimedia, and Web Technologies (DMWT) 6630/6632</li> </ul> <b>(Continued on next page)</b>	Computer Information Systems 6612/6614* <b>and</b> a combination of 18-week or 36-week courses listed for concentration, equivalent to a total of three 36-week courses <i>*18-week course</i>	Available upon completion of Computer Information Systems 6612 or Advanced Computer Information Systems 6613: <ul style="list-style-type: none"> <li>Administrative Assisting Assessment (NOCTI)</li> <li>MOS (Microsoft Office Specialist)* (Microsoft) (pass any one unique MOS exam at the core level)</li> <li>IC<sup>3</sup>* (Certiport)</li> <li>International Computer Driving License* (ICDL US)</li> </ul> See possibility of digital media certifications in Design, Multimedia, and Web Technologies.	Information Technology

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Notetaking 6241/6242* (may complement sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641 (requires Programming prerequisite)</li> <li>• Advanced Information Technology Certifications I (AITC) 6680</li> <li>• Advanced Information Technology Certifications II 6681 (requires AITC I prerequisite)</li> </ul> <p><i>*18-week course</i></p> <p>Also, see International Baccalaureate Information Technology in a Global Society 6613</p>			

## Computer Network Software Operations 6650

**Grade Levels:** 11, 12 (36 weeks)

**Prerequisites:** Keyboarding\* and Information Technology Fundamentals are recommended.

Computer Network Software Operations is designed to teach many aspects of computer support and network administration. Students learn networking concepts, from usage to components, and set up peer-to-peer network systems and client server networks. Students install and configure network cards and connect them to networks. Students learn how to install the operating systems, set up and manage accounts, load software, and set up and implement security plans. This course may include software-based network operating systems such as Novell NetWare and Microsoft Windows NT. If industry certification is the basis for this course, school divisions must plan the curriculum in cooperation with the certification provider.

## Advanced Computer Network Software Operations 6651

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Computer Network Software Operations

Advanced Computer Network Software Operations is designed to continue teaching aspects of network administration—focusing on management and support of network users and systems. Time is spent discussing responsibilities of computer professionals, training end users, evaluating new technology, developing system policies, troubleshooting workstations, managing network services and protocols, and effectively using e-mail and business communications. Students learn communications protocols, troubleshooting techniques for systems and client server networks, Web site management, and other advanced networking topics. They learn advanced techniques to install the operating systems, set up and manage accounts, load software, and set up and implement security plans. This course may include software-based network operating systems such as Novell NetWare and Microsoft Windows NT. If industry certification is the basis for this course, school divisions must plan the curriculum in cooperation with the certification provider.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Computer Network Software Operations 6650 and a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/ 6614*</li> <li>• Advanced Computer Information Systems 6613/ 6615* (requires CIS prerequisite)</li> <li>• Database Design and Management (DDM) (Oracle) 6660</li> <li>• Advanced Database Design and Management (Oracle) BUS 6661 (requires DDM prerequisite)</li> <li>• Design, Multimedia, and Web Technologies 6630/6632</li> <li>• Information Technology Fundamentals 6670</li> <li>• Office Administration 6621/6622*</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641 (requires Programming prerequisite)</li> <li>• Advanced Information Technology Certifications I (AITC) 6680</li> <li>• Advanced Information Technology Certifications II 6681 (requires AITC I prerequisite)</li> </ul> <p><i>*18-week course</i> Also, see International Baccalaureate Information Technology in a Global Society 6613.</p>	<p>Computer Network Software Operations 6650 and a combination of 18-week or 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p>	<p>Available upon completion of CNSO 6650 or Advanced CNSO 6651:</p> <ul style="list-style-type: none"> <li>• A+* (CompTIA)**</li> <li>• A+ Certification: Operating Systems Technologies Examination**</li> <li>• A+ Certification: Core Hardware Examination**</li> <li>• Brainbench Network Administration Certifications*+</li> <li>• Brainbench Systems Administration Certification *+</li> <li>• Brainbench Technical Support Certifications*+</li> <li>• Certified Novell Administrator* (Novell)</li> <li>• CIW Associate* (Prosoft Learning)</li> <li>• CIW Associate Certification: Internet Business Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Site Development Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Network Technology Foundations Examination* (Prosoft Learning)</li> <li>• CIW Professional* (Prosoft Learning)</li> </ul> <p><b>(Continued on next page)</b></p>	<p>Information Technology</p>

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
		<ul style="list-style-type: none"> <li>• Customer Support Specialist Certification* (Help Desk Institute)</li> <li>• Fundamentals of Wireless LANs Certificate* (Cisco Systems)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• INet* (CompTIA)</li> <li>• International Computer Driving License (ICDL US)</li> <li>• IT Essentials Certificate, Level 1 (Cisco Systems)</li> <li>• IT Essentials Certificate, Level 2 (Cisco Systems)</li> <li>• Linux+ (CompTIA)</li> <li>• Microsoft Certified Professional (MCP)* (Microsoft)</li> <li>• MOS (Microsoft Office Specialist)* (Microsoft) (pass any <b>one</b> unique MOS exam at the core level)</li> <li>• Unix Certificate* (Cisco Systems)</li> <li>• Voice and Data Cabling Certificate (Cisco Systems)</li> </ul> <p>Additional certification available upon completion of Advanced CNSO6651:</p> <ul style="list-style-type: none"> <li>• Network+* (CompTIA)</li> </ul>	
+Specific approved Brainbench Network Administration Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=22&amp;cat3=24">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=22&amp;cat3=24</a>			
+Specific approved Brainbench Technical Support Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=28">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=28</a>			

**Computer Solutions 6609, 6610** (middle school course, see page 12-1)

### Database Design and Management (Oracle) 6660

**Grade Levels:** 10, 11 (36 weeks)

**Prerequisite:** Information Technology Fundamentals is recommended.

This first-year course includes database design and programming. Students study database fundamentals to include database development, modeling, design, and normalization. In addition, students are introduced to database programming. Students gain the skills and knowledge needed to use features of database software and programming to manage and control access to data. Industry certification competencies will be used for the course.

### Advanced Database Design and Management (Oracle) 6661

**Grade Levels:** 11, 12 (36 weeks)

**Prerequisite:** Database Design and Management (Oracle)

Students study Java programming and Java database applications. The basics of object-oriented programming and the Java programming language are emphasized in this instruction. Students will prepare for industry certification in database applications and programming. Industry certification course competencies will be used for the course.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Database Design and Management (DDM) (Oracle) 6660 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Advanced Database Design and Management (Oracle) 6661 (requires DDM prerequisite)</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/ 6615* (requires CIS prerequisite)</li> <li>• Computer Network Software Operations (CNSO) 6650</li> <li>• Advanced Computer Network Software Operations 6651 (requires CNSO prerequisite)</li> <li>• Advanced Information Technology Certifications I (AITC) 6680</li> <li>• Advanced Information Technology Certifications II 6681 (requires AITC I prerequisite)</li> <li>• Information Technology Fundamentals 6670</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• (Programming 6640</li> <li>• Advanced Programming 6641 (requires Programming prerequisite)</li> </ul> <p>*18-week course</p> <p>Also, see International Baccalaureate Information Technology in a Global Society 6613</p>	<p>Database Design and Management (DDM) (Oracle) 6660 <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p>	<p>Available upon completion of DDM 6660 <b>or</b> Advanced DDM 6661:</p> <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS (Microsoft Office Specialist)* (Microsoft) (pass any one unique MOS exam at the core level)</li> <li>• Oracle Certified Program Examinations* (any Oracle Program Certification Exam) (Oracle)</li> </ul> <p>Additional certifications available upon completion of Advanced DDM 6661:</p> <ul style="list-style-type: none"> <li>• Brainbench Software Development Certifications+</li> <li>• Brainbench Web Administration Certifications+</li> <li>• Java Programming Certificate* (Cisco Systems)</li> <li>• Sun Certified Programmer for Java2 Platform* (Sun Microsystems)</li> </ul>	<p>Information Technology</p>
<p>+Specific approved Brainbench Software Development Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18</a></p>			
<p>+Specific approved Brainbench Web Administration Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=21">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=21</a></p>			

**Design, Multimedia, and Web Technologies 6630 (formerly Desktop/Multimedia Presentations)**

**Grade Level:** 10, 11, or 12 (36 weeks)

**Design, Multimedia, and Web Technologies 6632**

**Grade Level:** 10, 11, or 12 (18 weeks)

**Prerequisite:** Keyboarding\*

Students develop proficiency in creating desktop publications, multimedia presentations/projects, and Web sites using industry standard application software. Students incorporate principles of layout and design in completing publications and projects. Students design portfolios that may include business cards, newsletters, mini-pages, Web pages, multimedia presentations/projects, calendars, and graphics. Completion of this course may prepare students for industry certifications.

\*Keyboarding course(s) or teacher-approved, demonstrated, and documented touch keyboarding skills

**Advanced Design, Multimedia, and Web Technologies 6631**

**Grade Level:** 10, 11, or 12 (36 weeks)

**Advanced Design, Multimedia, and Web Technologies 6633**

**Grade Level:** 10,11, or 12 (18 weeks)

**Prerequisite:** Design, Multimedia, and Web Technologies

Students develop advanced skills in creating interactive media, Web sites, and publications for print and electronic distribution. Students work with sophisticated hardware and software, applying skills learned to real-world projects. Completion of this course may prepare students for industry certifications.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Design, Multimedia, and Web Technologies 6630/6632* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding Applications 6152, 6153*</li> <li>• Keyboarding 6151*</li> <li>• Office Administration 6621/6622*</li> <li>• Principles of Business and Marketing 6115/6116*</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641 (requires Programming prerequisite)</li> <li>• Advanced Information Technology Certifications I (AITC) 6680</li> <li>• Advanced Information Technology Certifications II 6681 (requires AITC I prerequisite)</li> </ul> <p>*18-week course</p> <p>Also, see International Baccalaureate Information Technology in a Global Society 6613</p>	<p>Design, Multimedia, and Web Technologies 6630/6632* <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p>*18-week course</p>	<p>Available upon completion of Design, Multimedia, and Web Technologies 6630 <b>or</b> Advanced Design, Multimedia, and Web Technologies 6631:</p> <ul style="list-style-type: none"> <li>• Adobe Certified Expert* (Adobe)</li> <li>• Brainbench Software Development Certifications*+</li> <li>• Brainbench Web Administration Certifications*+</li> <li>• Brainbench Web Design and Development Certifications*+</li> <li>• Brainbench Desktop Publishing Software Certifications*+</li> <li>• CIW Associate* (Prosoft Learning)</li> <li>• CIW Associate Certification: Internet Business Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Site Development Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Network Technology Foundations Examination* (Prosoft Learning)</li> <li>• CIW Professional* (Prosoft Learning)</li> <li>• IC<sup>3</sup>* (Certiport)</li> </ul> <p><b>(Continued on next page)</b></p>	<p>Information Technology</p>

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
		<ul style="list-style-type: none"> <li>• INet* (CompTIA)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• Macromedia Certified Professional* (Macromedia)</li> <li>• Master CIW Designer*** (Prosoft Learning)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> <li>• Web Design Certificate* (Cisco Systems)</li> <li>• WOW Certified Apprentice Webmaster* (World Organization of Webmasters)</li> <li>• WOW Certified Web Administrator* Apprentice (World Organization of Webmasters)</li> <li>• WOW Certified Web Designer Apprentice* (World Organization of Webmasters)</li> <li>• WOW Certified Web Developer Apprentice* (World Organization of Webmasters)</li> </ul>	
<p>+Specific approved Brainbench Software Development Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18</a></p> <p>+Specific approved Brainbench Web Administration Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=21">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=21</a></p> <p>+Specific approved Brainbench Web Design and Development Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=22">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=31&amp;cat3=22</a></p> <p>+Specific approved Brainbench Desktop Publishing Software Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=10">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=10</a></p>			

**Digital Input Technologies 6160****Grade Levels:** 7, 8, 9 (18 weeks)**Prerequisite:** Keyboarding\* is recommended.**Digital Input Technologies 6161****Grade Levels:** 7, 8, 9 (36 weeks)

Prerequisite: None

The Digital Input Technologies course introduces new and emerging tools that are quickly becoming standard in today's workplace. Students develop proficiency using Personal Data Assistants (PDAs), speech recognition software, and input tools for entering and manipulating text and data. The 36-week course offers secondary-level keyboarding skills.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Digital Input Technologies 6160*/6161 and a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems 6612/6614*</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding** 6151*</li> <li>• Keyboarding Applications** 6152/6153*</li> <li>• Legal Systems Administration 6735</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> *18 week course ** Only counted as sequential offering with DIT 6160. The 36-week course DIT 6161 contains keyboarding.	Digital Input Technologies 6160*/6161 and a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses: <i>*18 week course</i>	Available upon completion of Digital Input Technologies 6161: <ul style="list-style-type: none"> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	Information Technology

**Finance 6120****Grade Levels:** 10, 11, 12 (36 weeks)**Finance 6121****Grade Levels:** 10, 11, 12 (18 weeks)

Students explore many facets of financial decision-making involved in daily life. Skills in money management, record keeping, and banking are enhanced through the study of basic concepts of economics, insurance, credit, and other related topics. As a year offering, the course will also prepare students occupationally to plan, manage, and analyze the financial and monetary aspects and success of business enterprises, banking institutions, or other organizations.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Finance 6120/6121* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/ 6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Office Administration 6621/6622*</li> <li>• Principles of Business and Marketing 6115/6116*</li> </ul> *18-week course	Finance 6120/6121* <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses *18-week course	Available on completion of Finance 6120: <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	Finance

## Information Technology Fundamentals 6670

**Grade Levels:** 9, 10 (36 weeks)

**Prerequisite:** Keyboarding\* is recommended.

Information Technology IT Fundamentals introduces the essential skills needed for students to pursue specialized programs leading to technical and professional careers and certifications in the IT industry. Students have an opportunity to investigate career opportunities in four major IT areas: Information Services and Support, Network Systems, Programming and Software Development, and Interactive Media. The focus of the IT Fundamentals course is on introducing skills related to information technology basics, Internet fundamentals, network systems, computer maintenance/upgrading/troubleshooting, computer applications, programming, graphics, Web page design, and interactive media. Students explore ethical issues related to computers and Internet technology and develop teamwork and communication skills that will enhance their employability.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Information Technology Fundamentals 6670 and a combination of one or more of the following 18- and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>Advanced Information Technology Certifications (AITC) I 6680</li> <li>Advanced Information Technology Certifications II 6681 (requires AITC I prerequisite)</li> <li>Computer Applications 6611/6617*</li> <li>Computer Information Systems (CIS) 6612/6614*</li> <li>Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>Computer Network Software Operations (CSNO) 6650</li> <li>Advanced Computer Network Software Operations 6651 (requires CSNO prerequisite)</li> <li>Database Design and Management (Oracle) (DDM) 6660</li> <li>Advanced Database Design and Management 6661 (requires DDM prerequisite)</li> <li>Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWP prerequisite)</li> <li>Digital Input Technologies 6160*/6161</li> <li>Office Administration 6621/6622*</li> <li>Programming 6640</li> <li>Advanced Programming 6641 (requires Programming prerequisite)</li> </ul> <p><i>*18-week course</i></p>	<p>Programming 6640 and a combination of 18-week or 36-week courses, equivalent to a total of three 36-week courses</p> <hr/> <p>Information Technology Fundamentals 6670 may precede sequences for the following:</p> <ul style="list-style-type: none"> <li>Computer Network Hardware Operations 8542/8543/8544/8545</li> <li>Computer Systems Technology 8622/8623/8624</li> </ul>	<p>Available on completion of Information Technology Fundamentals 6670:</p> <ul style="list-style-type: none"> <li>IC<sup>3</sup>* (Certiport)</li> <li>International Computer Driving License* (ICDL US)</li> <li>IT Essentials Certificate, Level 1 (Cisco Systems)</li> <li>MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	Information Technology

**Keyboarding 6150** (middle school course, see page 12-1)

**Keyboarding 6151****Grade Levels:** 9, 10, 11, 12 (18 weeks)

This course is designed for secondary school students to develop and enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce personal, educational, and professional documents. (Students who can demonstrate touch keyboarding skills may test out and enter into the applications semester—6153—to develop document preparation skills.)

**Keyboarding Applications 6152****Grade Levels:** 9, 10, 11, 12 (36 weeks)

This course is designed for secondary school students to develop and enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce a variety of personal, educational, and professional documents.

**Keyboarding Applications 6153****Grade Levels:** 9, 10, 11, 12 (18 weeks)**Prerequisite:** Keyboarding (6150 or 6151)\*

Students enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce a variety of personal, educational, and professional documents. (Students may enroll in this applications semester—6153—after successful completion of previous keyboarding coursework or a documented performance test/record of 6150 or 6151 competencies.)

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Keyboarding 6151* or Keyboarding Applications 6152/6153* and a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/ 6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/ 6632*</li> <li>• Advanced Desktop Multimedia Presentations 6631/ 6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement the sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> *18-week course	Keyboarding 6151* or Keyboarding Applications 6152/6153* and a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses:	Available on completion of Keyboarding Applications 6152: <ul style="list-style-type: none"> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	Business, Management, and Administration
<i>Note:</i> When students take a keyboarding course as a prerequisite, they may test out through documented proficiency in the course competencies. However, the test-out option does not count toward a concentration or specialization sequence.			

**Legal Systems Administration 6735**

**Grade Levels:** 11, 12 (36 weeks)

**Legal Systems Administration 6736**

**Grade Levels:** 11, 12 (18 weeks)

**Prerequisites:** Keyboarding Applications\*

Students completing Office Administration and wishing to gain employment in the legal field may take this course to learn how to use legal terminology and procedures useful in preparing legal documents and functioning effectively in a law office. When this course is offered as a daily multiple-period class, the competencies identified in the Office Administration course may be included. Completion of this course, when combined with Accounting and Office Administration, may prepare students for the certification exam for Accredited Legal Professional. Completion may also lead to MOS certification.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p><b>Option 1</b> Legal Systems Administration 6735 (daily 2-period block)</p> <p><b>Option 2</b> Legal Systems Administration 6735/6736* (single or double period) <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Notetaking 6241/6242* (may complement the sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> <p><i>*18-week course</i></p>	<p>Legal Systems Administration 6735 (single or double period) <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p>	<p>Available upon completion of Legal Systems Administration 6735:</p> <ul style="list-style-type: none"> <li>• Administrative Assisting Assessment (NOCTI)</li> <li>• Certification for Legal Professionals (ALS) when combined with Office Administration and Accounting</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	<p>Business, Management, and Administration <b>or</b> Information Technology</p>

**Make It Your Business 6111, 6112** (middle school course, see page 12-2)

**Medical Systems Administration 6730**

**Grade Levels:** 11, 12 (36 weeks)

**Medical Systems Administration 6731**

**Grade Levels:** 11, 12 (18 weeks)

**Prerequisites:** Keyboarding Applications\*

Students completing Office Administration and wishing to gain employment in the medical field may take this course to learn how to use medical terminology and procedures useful in developing medical documents and functioning effectively in a medical office environment. When this course is offered as a daily multiple-period class, the competencies identified in the Office Administration course may be included.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p><b>Option 1</b> Medical Systems Administration 6735 (daily 2-period block)</p> <p><b>Option 2</b> Medical Systems Administration 6735/6736* (single or double period) <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Notetaking 6241/6242* (may complement the sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/ BUS6116*</li> <li>• Word Processing 6625/BUS6626*</li> </ul> <p><i>*18-week course</i></p>	<p>Medical Systems Administration 6730/6731* (single or double period) <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p><i>*18-week course</i></p> <p><b>or</b></p> <p>Medical Assistant I 8345 <b>and</b> Medical Assistant II 8346 <b>and</b> Medical Systems Administration 6730/6731*</p> <p><i>*18-week course</i></p>	<p>Available upon completion of Medical Systems Administration 6730:</p> <ul style="list-style-type: none"> <li>• Administrative Assisting Assessment (NOCTI)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	<p>Business, Management, and Administration <b>or</b> Information Technology</p>

**Notetaking 6241****Grade Levels:** 9, 10, 11, 12 (36 weeks)**Notetaking 6242****Grade Levels:** 9, 10, 11, 12 (18 weeks)**Prerequisite:** Keyboarding\* recommended

Students learn an easy, abbreviated writing system of notetaking that enables them to take and transcribe notes for educational, business, or personal use. Students explore reasons for taking notes, ways to listen effectively, and strategies for improving communication and study skills for academic success.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Notetaking may complement a Business/IT concentration sequence but must be offered with two or more other courses	Notetaking may complement a Business/IT concentration sequence but must be offered with two or more other courses	N/A	Business, Management, and Administration

**Office Administration 6621****Grade Level:** 10, 11, 12 (36 weeks)**Office Administration 6622****Grade Level:** 10, 11, 12 (18 weeks)**Prerequisite:** Keyboarding\*

Students enhance word processing and communication skills as they develop competencies needed by administrative support professionals. Students study office procedures such as information processing, telecommunications, electronic record management, and financial records management.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Office Administration 6621/6622* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>Accounting 6320</li> <li>Advanced Accounting 632 (requires Accounting prerequisite)</li> <li>Business Law 6131/6132*</li> <li>Business Management 6135/6136*</li> <li>Computer Applications 6611/6617*</li> <li>Computer Information Systems (CIS) 6612/6614*</li> <li>Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>Digital Input Technologies 6160*/6161</li> <li>Finance 6120/6121*</li> <li>Information Technology Fundamentals 6670</li> <li>Keyboarding Applications 6152/6153*</li> </ul> <b>(Continued on next page)</b>	Office Administration 6621*/6622 <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses *18-week course	Available upon completion of Office Administration 6621: <ul style="list-style-type: none"> <li>Administrative Assisting Assessment (NOCTI)</li> <li>Certification for Legal Professionals (ALS) when combined with Accounting and Legal Systems Administration</li> <li>IC<sup>3</sup>* (Certiport)</li> <li>International Computer Driving License* (ICDL US)</li> <li>MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	Business, Management, and Administration <b>or</b> Information Technology

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Keyboarding 6151*</li> <li>• Legal Systems Administration 6735</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement the sequence but must be offered with two or more other courses)</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/ 6116*</li> <li>• Word Processing 6625/6626*</li> </ul> <p><i>*18-week course</i></p>			

**Principles of Business and Marketing 6115**

**Grade Levels:** 9, 10 (36 weeks)

**Principles of Business and Marketing 6116**

**Grade Levels:** 9, 10 (18 weeks)

Students explore the roles of business and marketing in the free enterprise system and the global economy. Students study how the American economy operates and prepare to make decisions as consumers, wage earners, and citizens.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Principles of Business and Marketing 6115/6116* and a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Keyboarding 6151</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialization 6740/6741/6742</li> <li>• Word Processing 6625/6626*</li> </ul> <p><i>*18-week course</i></p>	<p>Principles of Business and Marketing 6115/6116* <b>and</b> a combination of the 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p>	<p>Available upon completion of Principles of Business and Marketing 6115:</p> <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> </ul>	<p>Business, Management, and Administration</p>

## Programming 6640

**Grade Levels:** 10, 11, 12 (36 weeks)

**Prerequisite:** Keyboarding\* and Information Technology Fundamentals are recommended.

Students explore computer concepts, use logic procedures, and implement programming procedures using one or more programming languages, such as Visual Basic.Net, Java, Python, C #, and C++. In addition, HTML or JavaScript may be used to create dynamic Web pages.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

## Advanced Programming 6641

**Grade Levels:** 11, 12 (36 weeks)

**Prerequisite:** Programming

Students use their knowledge of computer concepts, logic procedures, and object-oriented programming to develop an advanced level program application in one or more programming languages. Programming languages may include Visual Basic.Net, Java, Python, C #, and C++. In addition, HTML, JavaScript, or other industry-recognized programming language may be integrated in advanced Web page development or for use in industry certification programs.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Programming 6640 and a combination of one or more of the following 18-week or 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Advanced Programming 6641</li> <li>• Advanced Information Technology Certifications (AITC) I 6680</li> <li>• Advanced Information Technology Certifications (AITC) II 6681 (requires AITC I prerequisite)</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems (CIS) 6612/ 6614*</li> <li>• Advanced Computer Information Systems 6613/ 6615* (requires CIS prerequisite)</li> <li>• Computer Network Software Administration (CNSA) 6650</li> <li>• Advanced Computer Network Software Administration 6651 (requires CNSA prerequisite)</li> <li>• Database Design and Management (DDM) 6660</li> <li>• Advanced Database Design and Management 6661 (requires DDM prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/ 6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/ 6633* (requires DTMP prerequisite)</li> <li>• Information Technology Fundamentals 6670</li> <li>• Office Administration 6621/6622*</li> </ul> *18-week course Also, see International Baccalaureate Information Technology in a Global Society IB6613.	Programming 6640 and a combination of 18-week or 36-week courses, equivalent to a total of three 36-week courses	Available upon completion of Programming 6640 <b>or</b> Advanced Programming 6641: <ul style="list-style-type: none"> <li>• Brainbench Software Development Certifications+</li> <li>• CIW Associate* (Prosoft Learning)</li> <li>• CIW Associate Certification: Internet Business Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Site Development Foundations Examination* (Prosoft Learning)</li> <li>• CIW Associate Certification: Network Technology Foundations Examination* (Prosoft Learning)</li> <li>• CIW Professional* (Prosoft Learning)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• Microsoft Certified Professional* (Microsoft)</li> </ul> Available upon completion of Advanced Programming 6641: <ul style="list-style-type: none"> <li>• Java Programming Certificate (Cisco Systems)</li> <li>• Sun Certified Programmer for Java2 Platform* (Sun Microsystems)</li> </ul>	Information Technology
+Specific approved Brainbench Software Development Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=26&amp;cat3=18</a>			

**Word Processing 6625**

**Grade Levels:** 9, 10, 11, 12 (36 weeks)

**Word Processing 6626**

**Grade Levels:** 9, 10, 11, 12 (18 weeks)

**Prerequisite:** Keyboarding\*

Students develop intermediate to advanced level word processing skills using a variety of software functions, including graphics, desktop publishing, and telecommunications. Students gain competence integrating other applications such as database and spreadsheet into word processing activities. Classroom experiences also provide for skill development in communication.

\*Keyboarding course(s) or teacher approved demonstrated and documented touch keyboarding skills

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Word Processing 6625, 6626* <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Computer Information Systems (CIS) 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Legal Systems Administration 6735/6736*</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6621/6622*</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Principles of Business and Marketing 6115/6116*</li> </ul> <p>*18-week course</p>	<p>Word Processing 6625/6626* <b>and</b> a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p>*18-week course</p>	<p>Available upon completion of Word Processing 6625:</p> <ul style="list-style-type: none"> <li>• Administrative Assisting Assessment (NOCTI)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	<p>Business, Management, and Administration <b>or</b> Information Technology</p>

## Special Programs

### Office Specialist I 6740 (Targeted Populations)

**Grade Levels:** 9, 10, 11, 12 (36 weeks)

### Office Specialist II 6741 (Targeted Populations)

**Grade Levels:** 10, 11, 12 (36 weeks)

### Office Specialist III 6742 (Targeted Populations)

**Grade Levels:** 11, 12 (36 weeks)

Students complete the Office Specialist sequence identified locally or progress in the sequence until prepared to transfer into other business courses. Students develop skills in areas including keyboarding, word processing, office procedures, and records management. If a fourth year is needed, the teacher should use simulated activities in the following areas: word processing, spreadsheets, databases, telecommunications, desktop publishing, and records management.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p><b>Option 1</b> Office Specialist I 6740 (daily 2-period block)</p> <p><b>Option 2</b> Office Specialist I 6740 (single or double period) and a combination of one or more of the following 18-week or 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Office Specialist II 6741</li> <li>• Office Specialist III 6742</li> <li>• Accounting 6320</li> <li>• Advanced Accounting 632 (requires Accounting prerequisite)</li> <li>• Business Law 6131/6132*</li> <li>• Business Management 6135/6136*</li> <li>• Computer Applications 6611/6617*</li> <li>• Computer Information Systems 6612/6614*</li> <li>• Advanced Computer Information Systems 6613/6615* (requires CIS prerequisite)</li> <li>• Design, Multimedia, and Web Technologies (DMWT) 6630/6632*</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631/6633* (requires DMWT) prerequisite)</li> <li>• Digital Input Technologies 6160*/6161</li> <li>• Finance 6120/6121*</li> <li>• Information Technology Fundamentals 6670</li> <li>• Keyboarding Applications 6152/6153*</li> <li>• Keyboarding 6151*</li> <li>• Legal Systems Administration 6735</li> <li>• Medical Systems Administration 6730/6731*</li> <li>• Notetaking 6241/6242* (may complement the sequence but must be offered with two or more other courses)</li> <li>• Office Administration 6721/6722</li> <li>• Principles of Business and Marketing 6115/6116*</li> <li>• Word Processing 6625/6626*</li> </ul> <p><i>*18-week course</i></p>	<p>Office Specialist I 6740 and a combination of 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p>	<p>Available upon completion of Office Specialist I 6740 or Office Specialist II 6741 or Office Specialist III 6742:</p> <ul style="list-style-type: none"> <li>• Administrative Assisting Assessment (NOCTI)</li> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	<p><b>Career Cluster:</b> Business, Management, and Administration</p>

**Business Individualized Program 6745**

Grade Level: 7, 8, 9, 10, 11, 12

This course serves students with special needs who desire and can benefit from Business studies. The course should be developed cooperatively between local Business teachers and other specialized education personnel based on individual needs of the students. The task/competency list contains a list of competencies that might be included in most of the students' individual plans.

**Note:** Essential competencies should be defined by the student's Individualized Education Plan (IEP).

**Business and Information Technology Dual Enrollment 6810**

For information, please contact the Business and Information Technology Program Service, Virginia Department of Education.

**International Baccalaureate Business Management IB6135**

For description, see VERSO or contact Virginia Department of Education, Business and Information Technology Program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
See sequences associated with Business Management 6135.	N/A	N/A	Business, Management, and Administration

**International Baccalaureate Information Technology in a Global Society IB6613**

For description, see VERSO or contact Virginia Department of Education, Business and Information Technology Program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
See sequences associated with the following: <ul style="list-style-type: none"> <li>• Computer Applications 6611/6617</li> <li>• Computer Information Systems 6612/6614</li> <li>• Computer Network Software Operations 6650</li> <li>• Database Design and Management (Oracle) 6660</li> <li>• Desktop/Multimedia Presentations 6630/6632</li> <li>• Programming 6640</li> </ul>	N/A	Available upon completion of Information Technology in a Global Society IB6613: <ul style="list-style-type: none"> <li>• IC<sup>3</sup>* (Certiport)</li> <li>• International Computer Driving License* (ICDL US)</li> <li>• MOS* (Microsoft) (pass any one unique MOS exam at the core level)</li> </ul>	Information Technology





## **Section 3: Family and Consumer Sciences 2006-2007**

### **Need course information?**

- Course Descriptions
- Course Sequences
- Certifications, Licenses, and Assessments
- Career Clusters





## Section 3: Family and Consumer Sciences Course Descriptions, Sequences, Certifications, Career Clusters

### Section Overview

---

This section presents course information applicable to the Family and Consumer Sciences program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Middle School Courses

---

Middle school courses are listed and described in Section 12, Career Exploration and Middle School.

**Note:** ProTeam is reported in the Education and Training cluster; other FCS middle school courses are reported in the Human Services cluster. Completer sequences and certifications do not apply.

Course Title and Code	Section 12 Page
• Exploring Work and Family Roles 8204, 8206, 8208, 8241, 8242, 8243, 8244, 8245	12-4
• GRADS 8211, 8212	12-4
• ProTeam 9060, 9061	12-6

## High School Course Credit in Middle School

---

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. The Family and Consumer Sciences secondary course that may be offered in middle school for high school credit is **Resource Management 8214/8219**.

## Work Focus Courses: Secondary

---

### Culinary Arts I 8275 (formerly Food Occupations I)

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Culinary Arts is recommended.

Students prepare for managerial, production, and service skills used in government, commercial, or independently owned institutional food establishments and related food industry occupations. Their study includes planning, selecting, storing, purchasing, preparing, and serving food and food products; basic nutrition, sanitation, and food safety; the use and care of commercial equipment; serving techniques; and the operation of institutional food establishments. Critical thinking, practical problem

solving, and entrepreneurship opportunities within the field of culinary arts are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

**Culinary Arts II 8276 (formerly Food Occupations II)**

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Culinary Arts I is recommended.

Students extend and expand skills learned in Culinary Arts I, preparing for occupations such as chef/cook, baker/pastry helper, pastry decorator, hospitality worker, dietetic aide/assistant, food demonstrator, mixologist, and entrepreneur. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of culinary arts are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Culinary Arts I 8275 and a combination of courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Culinary Arts II 8276</li> <li>• Introduction to Culinary Arts 8250</li> <li>• Individual Development 8209*/8210</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Resource Management 8214*/8219</li> <li>• Work and Family Management 8205*8282</li> <li>• GRADS 8213</li> </ul> *18-week course	Culinary Arts I 8275 and a combination of courses listed for concentration, equivalent to a total of three 36-week courses	Available upon completion of Culinary Arts I or II: <ul style="list-style-type: none"> <li>• ACCESS (American Culinary Federation)</li> <li>• Commercial Foods Assessment (NOCTI)</li> <li>• Food Production Management and Services Assessment (NOCTI)</li> <li>• ProStart Program Certification (Levels 1 and/or 2) (Education Foundation of the National Restaurant Association)</li> <li>• Retail Commercial Baking (NOCTI)</li> </ul>	Hospitality and Tourism

**Culinary Arts I 8521**

**Grade Level:** 10 or 11

**Culinary Arts II 8522**

**Grade Level:** 11 or 12

**Prerequisite:** Culinary Arts I

**Culinary Arts III 8523**

**Grade Level:** 12

**Prerequisite:** Culinary Arts II

Students are prepared for job entry at the semi-skilled level for food service occupations. Instructional areas include nutrition, handling and storing of food, sanitation, and the microbiology of food spoilage. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All past T&I courses available for the 3-year scheduling option continue to be listed as specializations.	<ul style="list-style-type: none"> <li>Culinary Arts I 8521</li> <li>Culinary Arts II 8522</li> <li>Culinary Arts III 8523 or work-based learning experience</li> </ul>	Available upon completion of Culinary Arts sequence: <ul style="list-style-type: none"> <li>ACCESS (ACF)</li> <li>Commercial Foods Assessment (NOCTI)</li> <li>Food Production, Management, and Services Assessment (NOCTI)</li> <li>ProStart Program Certification (Levels 1 and/or 2) (Educational Foundation of the National Restaurant Association)</li> <li>Retail Commercial Baking (NOCTI)</li> </ul>	Hospitality and Tourism

### Early Childhood Education I 8285

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Early Childhood Education is recommended.

Students prepare to be primary providers of home-, family-, or institution-based child care services by focusing their study on the planning, organizing, and conducting of meaningful play and learning activities; child monitoring and supervision; record keeping; and referral procedures. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of early childhood education are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

### Early Childhood Education II 8286

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Early Childhood Education I

Students prepare for positions in child care centers as child care attendants, kindergarten aides, or child care assistants; as foster parents; or as entrepreneurs. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of early childhood education are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Early Childhood Education I 8285 <b>and</b> a combination of one or more of the following courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>Early Childhood Education II 8286</li> <li>Family Relations 8223*/8225</li> <li>Individual Development 8209*/8210</li> <li>Parenting 8231*/8232</li> <li>Introduction to Early Childhood Education 8234</li> <li>GRADS 8213 (with cooperative education)</li> </ul> *18-week course	Early Childhood Education I 8285 <b>and</b> Early Childhood Education II 8286 <b>and</b> a combination of courses listed for concentration, equivalent to a total of three 36-week courses	Available upon completion of Early Childhood Education I <b>or</b> II: <ul style="list-style-type: none"> <li>Early Childhood Care and Education Assessment (NOCTI)</li> </ul>	Education and Training

### Family and Human Services I 8264

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Family and Human Services (recommended)

Students prepare for occupations related to individual and family health; consumer and community special services; nutrition and dietary modification; home maintenance, management, and adaptation to physical restrictions; services to homebound individuals of all ages; and services to the terminally ill. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of home and community care are emphasized. Teachers incorporate the skills of math, science, written and oral communications, and computer applications when appropriate in the content.

### Family and Human Services II 8265

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Family and Human Services I

Students continue to prepare for occupations related to individual, family, community health and well-being. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of home and community care are emphasized. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field early childhood education are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Family and Human Services I 8264 <b>and</b> a combination of one or more of the following courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"><li>• Family and Human Services II 8265</li><li>• Introduction to Family and Human Services 8237*/8238</li><li>• Family Relations 8223</li><li>• Parenting 8231*/8232</li><li>• Resource Management 8214</li><li>• Introduction to Early Childhood Education and Services 8233</li><li>• Work and Family Management 8205</li><li>• GRADS 8213 (with cooperative education)</li></ul> <i>*18-week course</i>	Family and Human Services I 8264 <b>and</b> Family and Human Services II 8265 <b>and</b> a combination of courses listed for concentration, equivalent to a total of three 36-week courses  Also available for specialization: Any Family and Human Services sequence combined with Home Health Aide 8364	N/A	Human Services

### Fashion Design I 8280

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Fashion Design and Marketing is recommended.

Students prepare for occupations concerned with the spectrum of clothing, apparel, and textiles production and services, including but not limited to construction, fabric and fabric care, pattern design, principles of clothing construction and selection, fitting and alterations for ready-to-wear garments, custom tailoring, and clothing maintenance. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of fashion are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

## Fashion Design II 8281

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Fashion Design I

Continuing their study as an in-depth extension of Fashion Design I, students focus on occupational skills identified as essential for fashion design aides, drapers, fabric demonstrators, alteration aides, costume aides, menders, and fabric/accessories clerks. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of fashion design are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Fashion Design I 8280 and a combination of the following courses, equivalent to a total of two 36-week courses <ul style="list-style-type: none"><li>• Fashion Design II 8281</li><li>• Introduction to Fashion Design and Marketing Occupations 8248</li><li>• Individual Development 8209*/8210</li><li>• Life Planning 8226*/8227</li><li>• Resource Management 8214*/8219</li></ul> <i>*18-week course</i>	Fashion Design I 8280 <b>and</b> Fashion Design II 828 <b>and</b> a combination of courses listed for concentration, equivalent to a total of three 36-week courses	N/A	Arts, Audio-Video Technology, and Communications

## Hospitality Services I 8202

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Hospitality, Tourism, and Recreation (recommended)

Students begin preparation for employment in the systemwide hospitality- and/or hotel/motel- and restaurant-related industries by focusing on principles of operations in the travel and tourism industries, hotel and lodging facilities, food services, recreation, hospitality planning, and business operations. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of hospitality are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

## Hospitality Services II 8203

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Hospitality Services I (recommended)

Students continue this in-depth extension of Hospitality Services I by mastering occupational skills for workers serving as airline flight attendants, airline lounge receptionists, passenger service representatives, hosts/ hostesses for hotels/motels, house cleaners, housekeeping maids, linen room attendants, guest service clerks, establishment guides, lodging facilities attendants, recreation aides, weight reduction leaders, and entrepreneurs. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of hospitality services are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Hospitality Services I 8202 <b>and</b> a combination of one or more of the following 18- and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Hospitality Services II 8203</li> <li>• Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259</li> <li>• Resource Management 8219</li> <li>• GRADS 8213</li> </ul> <i>*18-week course</i>	Hospitality Services I 8202 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses	Available upon completion of Hospitality Services I: <ul style="list-style-type: none"> <li>• Hospitality Management—Food and Beverage Option Assessment (NOCTI)</li> <li>• Hospitality Management—Lodging Option Assessment (NOCTI)</li> <li>• Lodging Management Level 1 (AH&amp;LA)</li> <li>• START Certification (AH&amp;LA)</li> </ul> Available upon completion of Hospitality Services II: <ul style="list-style-type: none"> <li>• Hospitality Management—Food and Beverage Option Assessment (NOCTI)</li> <li>• Hospitality Management—Lodging Option Assessment (NOCTI)</li> <li>• Lodging Management Level 2 (AH&amp;LA)</li> <li>• START Certification (AH&amp;LA)</li> </ul>	Hospitality and Tourism

### Interior Design I 8295

**Grade Level:** 11 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Introduction to Housing, Home Furnishings, and Design (recommended)

Students prepare for employment in the entire spectrum of home furnishings and decoration by acquiring skills that include selection, purchase, design, and decoration of home furnishings and equipment; floral design; accessory construction; and textiles and prepare for continuing education leading to a career in interior design, space planning, or interior architecture. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of interior design are emphasized. Teachers incorporate the skills of math, science, written and oral communication, and computer application when appropriate in the content.

### Interior Design II 8296

**Grade Level:** 12 (36 weeks, 2 or 3 periods per day or equivalent time per week)

**Prerequisite:** Interior Design I (recommended)

Students engage in an in-depth extension of Interior Design I by focusing on occupational skills for workers employed as color consultants; kitchen design consultants; interior design aides; showroom assistants; furniture rental consultants; sales associates for china, silver, curtains, draperies, furniture, floor coverings, and household appliances; and residential and commercial property assistant managers. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the field of interior design are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Interior Design I 8295 <b>and</b> a combination of one or more of the following 18- and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Interior Design II 8296</li> <li>• Introduction to Housing, Home Furnishings, and Design Occupations 8255</li> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• GRADS 8213</li> </ul> <i>*18-week course</i>	Interior Design I 8295 <b>and</b> Interior Design II 8296 <b>and</b> a combination of courses listed for concentration, equivalent to a total of three 36-week courses	N/A	Arts, Audio-Video Technology, and Communications

## Other Work Focus Courses

**Note:** Career Pathways and Work-Based Learning are reported in the Education and Training family; GRADS is reported in the Human Services family. Completer sequences and certifications do not apply.

### Career Pathways (Career Exploration) Phase 1 9070

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 1 prepares students to be "career investigators." To obtain the title, students must assess their role in society, identify their role as a worker, analyze their personal assets, complete a basic exploration of career clusters and select career fields or occupations for further study, and secure a career investigator (job shadowing) position with a local employer.

### Career Pathways (Career Skills) Phase 2 9071

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 2 consists of an in-depth study of one to four or more career clusters through a variety of investigative activities with local employers. Students observe, analyze, and report on the demand for workers, worker qualifications, organizational structures, quality control measures, selected policies and regulations, ethical issues, and rewards of work. Students who complete Phase 2 successfully qualify to become "career analysts."

### Career Pathways (Career Match) Phase 3 9072

**Grade Levels:** 6-12 (Time and schedule locally determined)

In Phase 3, students match their interests and aptitudes with occupational information, investigate a variety of pathways to career success, and reinforce the skills and knowledge needed for paid employment, particularly in the challenging 21st-century workplace. Pathways may include paid or volunteer employment experiences while the student is still in high school; continuing education opportunities such as college degree programs, apprenticeships, two-year specialized Tech Prep programs, or military experience; or any combination that will enhance progress toward a career goal.

### **Exploring Entrepreneurship 9093**

**Grade Levels:** 9, 10, 11, 12 (18 weeks)

Students explore qualities of individual enterprise, or the art of succeeding in a career. They develop skills needed to advance in an ever-changing work environment. Specifically, students develop competencies in decision making, long-range planning, effective communication, accountability, responsibility, and continuing education. Both individual development and business plan development are examined as concurrent career pathways.

### **Entrepreneurship Education 9094**

**Grade Levels:** 11,12 (36 weeks)

This course is designed for students who wish to concentrate on strategies for career development through ownership/management of their own businesses. Although individual skills are emphasized, the focus of the course is on development of a business plan, including the following: Determination of type of business enterprise, legal considerations, location selection, financing, steps in getting the enterprise started, marketing strategy, and interaction with successful entrepreneurs.

Entrepreneurship courses may be added to many sequences to provide opportunities for students to investigate or prepare for business ownership. More information is available from the Career Connections Service Area, Virginia Department of Education.

<b>Concentration Sequences</b>	<b>Specialization Sequences</b>	<b>Certification/License/Assessment Available</b>	<b>Career Cluster</b>
Entrepreneurship courses may be included <b>in addition to</b> any work or family focus concentration.	Entrepreneurship courses may be included <b>in addition to</b> any work or family focus concentration.	N/A	Marketing, Sales, and Service

### **Family and Consumer Sciences Dual Enrollment—Postsecondary 8266**

For information, please contact the Family and Consumer Sciences program area, Virginia Department of Education.

### **GRADS Work Focus/Occupational Experience 8213**

**Grade Levels:** 11-12 (36 weeks, single period)

Students enrolled in the Graduation, Reality, and Dual-role Skills Program (GRADS) concentrate on developing self-esteem; using effective communication skills; maintaining positive relationships; promoting wellness, prenatal, and postnatal care; evaluating the cost of parenthood; adjusting to parenthood; understanding child development; providing child care; managing family relationships; exploring careers; applying employability skills; managing economic resources and expenditures; and balancing work and family. Teachers highlight the basic skills of math and science when appropriate in the content.

### **Introduction to Leadership 9091**

**Grade Levels:** 9-10 (18 weeks)

This course equips students with individual and group leadership skills. Course content includes leadership principles, officer training, parliamentary law, public speaking, effective communication, positive public relations skills, and techniques of organizing and conducting group meetings and activities. Students are encouraged to be active members of a community or school organization.

### Leadership Development 9092

**Grade Levels:** 11-12 (18 to 36 weeks)

Students develop competencies in identifying individual aptitudes in relation to effective leadership skills, understanding organizational behavior, using effective communication in the workplace, handling human resources and organizational problems, supervising and training employees, resolving conflict, and planning for the future. Continuing education in leadership is emphasized as well as practical leadership experiences in cooperation with school and community leaders.

Leadership courses may be added to many sequences to help students recognize, prepare for, or engage in leadership opportunities. More information is available from the Career Connections Service Area, Virginia Department of Education.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Leadership courses may be included <b>in addition to</b> any work or family focus concentration.	Leadership courses may be included <b>in addition to</b> any work or family focus concentration.	N/A	Education and Training

### Teacher Cadet 9062

**Grade Level:** 12 (36 weeks)

The Teacher Cadet course introduces seniors to a career in teaching and education. The primary elements of the curriculum components are *the learner, the school, and the teacher and teaching*. The components are intentionally broad in scope and provide a great deal of flexibility based on the career interest of a student. In addition to the fundamental curriculum components, all students are required to participate in an internship outside the teacher cadet classroom. The internship may involve the pre-school level through grade 12.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Teacher Cadet (9062) (36 weeks) <b>and</b> two of the following 18-week courses: <ul style="list-style-type: none"> <li>• Individual Development 8209</li> <li>• Introduction to Early Childhood Education 8233</li> <li>• Introduction to Leadership 9091</li> <li>• Life Planning 8226</li> <li>• Parenting 8231</li> </ul>	N/A	N/A	Education and Training
Teacher Cadet (9062) (36 weeks) and one of the following 36-week courses: <ul style="list-style-type: none"> <li>• Early Childhood Education I 8285</li> <li>• Early Childhood Education II 8286</li> <li>• Individual Development 8210</li> <li>• Introduction to Early Childhood Education 8234</li> <li>• Leadership Development 9092</li> <li>• Life Planning 8227</li> <li>• Parenting 8232</li> </ul>			

## Transition Focus Courses: Secondary

### Introduction to Culinary Arts 8249

**Grade Levels:** 10-12 (18 weeks, single period)

### Introduction to Culinary Arts 8250

**Grade Levels:** 10-12 (36 weeks, single period)

The competencies focus on identifying and exploring the individual careers within the food service industry. Units of study include food science and technology, dietetics and nutrition services, contemporary cuisines and service styles, food and beverage production and preparation, and food safety and sanitation. Teachers highlight the basic skills of math, science, and communication when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Culinary Arts 8249*/8250 <b>and</b> a combination of one or more of the following 18-week and 36-week courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> </ul> * 18-week course	Introduction to Culinary Arts 8249*/8250 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses	N/A	Hospitality and Tourism

### Introduction to Early Childhood Education and Services 8233

**Grade Levels:** 10-12: (18 weeks, single period)

### Introduction to Early Childhood Education and Services 8234

**Grade Levels:** 10-12: (36 weeks, single period)

The child care and education competencies focus on the principles of child growth and development; development of self-concepts and building self-esteem; learning experiences for children; principles of guiding children; healthy and safe environments; career development; and careers related to child care. Teachers highlight basic skills of math, science, and communication when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Early Childhood Education and Services 8233*/8234 <b>and</b> a combination of one or more of the following 18-week and 36-week courses equivalent at least to two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Early Childhood Education and Services I 8285</li> <li>• Early Childhood Education and Services II 8286</li> </ul> * 18-week course	Introduction to Early Childhood Education and Services 8233*/8234 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Education and Training

**Introduction to Family and Human Services 8237**

**Grade Levels:** 10-12 (18 weeks, single period)

**Introduction to Family and Human Services 8238**

**Grade Levels:** 10-12 (36 weeks, single period)

The focus of Introduction to Family and Human Services is practical problem solving, research, critical thinking, and career decision making. Professional opportunities within the cluster of health, human, and public service are identified and analyzed. Career investigation includes the areas of elder and intergenerational care services as well as family and social services. Teachers will incorporate the skills of math, science, written and oral communication, and computer applications when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Family and Human Services 8237*/ 8238 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/ 8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/ 8219</li> <li>• Family and Human Services I 8264</li> <li>• Family and Human Services II 8265</li> </ul> * 18-week course	Introduction to Family and Human Services 8237*/8238 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Human Services

**Introduction to Fashion Design and Marketing 8247****Grade Levels:** 10-12 (18 weeks, single period)**Introduction to Fashion Design and Marketing 8248****Grade Levels:** 10-12 (36 weeks, single period)

The fashion design and merchandising competencies focus on identifying and exploring the individual careers within the fashion design, manufacturing, and merchandising industry. Units of study include the relationships that exist among all areas of the clothing industry; related global and economic issues; exploration of careers in color, design, and finishing; auxiliary fashion industries; clothing maintenance, alterations, and repair; entrepreneurial opportunities in related areas; and the skills and characteristics necessary for success in careers in the textile, design, apparel production, and fashion merchandising industries. Teachers highlight the basic skills of math, science, and communication when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Fashion Design and Marketing 8247*/8248 <b>and</b> a combination of one or more of the following 18-week and 36-week courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Resource Management 8214*/8219</li> <li>• Fashion Design I 8280</li> <li>• Fashion Design II 8281</li> </ul> * 18-week course	Introduction to Fashion Design and Marketing 8247*/ 8248 <b>and</b> a combination of one or more of the following 18-week and 36-week courses equivalent to a total of three 36-week courses * 18-week course	N/A	Arts, Audio-Video Technology, and Communications

**Introduction to Hospitality, Tourism, and Recreation 8258****Grade Levels:** 10-12 (18 weeks, single period)**Introduction to Hospitality, Tourism, and Recreation 8259****Grade Levels:** 10-12 (36 weeks, single period)

Students enrolled in the hospitality, tourism, and recreation course focus on hospitality operations on a system-wide basis, including both travel arrangements and promotion and the provision of traveler facilities. The program includes instruction in principles of operation of travel and tourism, hotel and lodging facilities, food services, and recreation facilities industries; hospitality marketing strategies; and industry policies and regulations. Teachers highlight the basic skills of math, science, and communications when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Hospitality, Tourism, and Recreation Occupations 8258/8259 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Hospitality Services I 8202</li> <li>• Hospitality Services II 8203</li> </ul> * 18-week course	Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Hospitality and Tourism

**Introduction to Housing, Home Furnishings, and Design 8254**

**Grade Levels:** 10-12 (18 weeks, single period)

**Introduction to Housing, Home Furnishings, and Design 8255**

**Grade Levels:** 10-12 (36 weeks, single period)

The housing, home furnishings, and design competencies focus on identifying and exploring the individual careers in all areas of housing and interior environments. Units of study include the physical and psychological aspects of environments; interior alternatives; historical, social, cultural, and geographical influences on the industry; investigation of careers in construction, real estate, home design, and home care and maintenance; identification of career options in residential and commercial interior design; store planning, institutional, and contract interior design; and the business aspects of careers related to environments. The individual characteristics and skills necessary for career success in the industry of housing and interior environments are investigated. Teachers highlight the basic skills of math, science, and communication when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*/8255 <b>and</b> a combination of one or more of the following 18-week and 36-week courses equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Interior Design I 8295</li> <li>• Interior Design II 8296</li> </ul> * 18-week course	Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*/8255 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Marketing, Sales, and Service

**Work and Family Management 8205**

**Grade Levels:** 10-12 (18 weeks, single period)

**Work and Family Management 8282**

**Grade Levels:** 10-12 (36 weeks, single period)

The work and family management course focuses on balancing the multiple demands of career, family, and personal life; the interpersonal skills needed to build strong relationships in the family and the workplace; and conflict management, problem solving, goal setting, stress management, and resource management in work and family. Honors credit is available as a local option. Teachers will incorporate the skills of math, science, written and verbal communication, and computer applications when appropriate in the content.

**Note:** This transition focus course must be combined with family focus or work focus courses to make an approved concentration sequence.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Work and Family Management 8205*/8282 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Leadership CCN9091*</li> <li>• Leadership Development CCN9092</li> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> <li>• Early Childhood Education and Services I 8285</li> <li>• Early Childhood Education and Services II 8286</li> <li>• Family and Human Services I 8264</li> <li>• Family and Human Services II 8265</li> <li>• Fashion Design Occupations I 8280</li> <li>• Fashion Design Occupations II 8281</li> <li>• Hospitality Services I 8202</li> <li>• Hospitality Services II 8203</li> <li>• Interior Design I 8295</li> <li>• Interior Design II 8296</li> </ul> <p>* 18-week course</p>	<p>Work and Family Management 8205*/8282 <b>and</b> a combination of one or more 18-week and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p>* 18-week course</p>	<p>N/A</p>	<p><b>Career Cluster:</b> Human Services</p>

## Family Focus Courses: Secondary

### Family Relations 8223

**Grade Levels:** 9-12 (18 weeks, single period)

### Family Relations 8225

**Grade Levels:** 9-12 (36 weeks, single period)

Students enrolled in Family Relations focus on analyzing the significance of the family, nurturing human development in the family throughout the life span, analyzing factors that build and maintain healthy family relationships, developing communication patterns that enhance family relationships, dealing effectively with family stressors and conflicts, managing work and family roles and responsibilities, and analyzing social forces that influence families across the life span. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of family responsibilities and services are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Family Relations 8223* or Family Relations 8225 and a combination of the following courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Individual Development 8209*/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/82378</li> <li>• Work and Family Management 8205</li> <li>• GRADS 8277*/8278</li> </ul> *18-week course	Family Relations 8223* or Family Relations 8225 and a combination of courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Human Services

### Individual Development 8209

**Grade Levels:** 9-12 (18 weeks, single period)

### Individual Development 8210

**Grade Levels:** 9-12 (36 weeks, single period)

Students enrolled in Individual Development focus on encouraging personal potential of self and others throughout the life span; enhancing positive views of self and others; managing stressful situations; formulating a plan to achieve career goals; forming healthy, caring relationships with family members and peers; managing conflict; choosing responsible ways to express oneself; and evaluating the importance of responsible parenting to individuals, families, and society. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of individual mental, emotional, and physical health are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Individual Development 8209*/8210 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Consumer Services 8235*/8236</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/ 8238</li> <li>• Introduction to Fashion Design and Marketing Occupations 8247*/8248</li> </ul> *18-week course	Individual Development 8209*/8210 <b>and</b> any combination of courses listed for concentration, equivalent to a total of three 36-week courses * 18-week course	N/A	Human Services

**Life Planning 8226**

**Grade Levels:** 9-12 (18 weeks, single period)

**Life Planning 8227**

**Grade Levels:** 9-12 (36 weeks, single period)

Students enrolled in Life Planning focus on developing a life management plan; caring for self and others to ensure wellness; building and maintaining constructive relationships; building and maintaining strong, functional families; developing strategies for lifelong career planning; coordinating personal and career responsibilities; and establishing a plan for using resources. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of personal, family, and career planning are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Life Planning 8226*/8227 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209/8210</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Culinary Arts 8249*/8250</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/8238</li> <li>• Introduction to Fashion Design and Marketing Occupations 8247*/8248</li> <li>• Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259</li> <li>• Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*/8255</li> <li>• Work and Family Management 8205*/8282</li> <li>• GRADS 8278</li> </ul> <p><i>*18-week course*18-week course</i></p>	<p>Life Planning 8226*/8227 <b>and</b> any combination of the 18- and 36-week courses listed for concentration, equivalent to a total of three 36-week courses</p> <p><i>*18-week course</i></p>	N/A	Human Services

**Nutrition and Wellness 8228**

**Grade Levels:** 9-12 (18 weeks, single period)

**Nutrition and Wellness 8229**

**Grade Levels:** 9-12 (36 weeks, single period)

Students enrolled in Nutrition and Wellness focus on making choices that promote wellness and good health; analyzing relationships between psychological and social needs and food choices; choosing foods that promote wellness; obtaining and storing food for self and family; preparing and serving nutritious meals and snacks; selecting and using equipment for food preparation; and identifying strategies to promote optimal nutrition and wellness of society. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of nutrition and wellness are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Nutrition and Wellness 8228*/8229 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Parenting 8231*/8232</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Culinary Arts 8249*/8250</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/ 8238</li> <li>• Introduction to Fashion Design and Marketing Occupations 8247*/8248</li> <li>• Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259</li> <li>• Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*8255</li> <li>• Introduction to Leadership 9091</li> <li>• Work and Family Management 8205*/8282</li> <li>• GRADS 8278</li> </ul> <i>*18-week course</i>	Nutrition and Wellness 8228/8229 <b>and</b> a combination of 18- and 36-week courses listed for concentration, equivalent to a total of three 36-week courses <i>*18-week course</i>	N/A	Human Services

**Parenting 8231**

**Grade Levels:** 9-12 (18 weeks, single period)

**Parenting 8232**

**Grade Levels:** 9-12 (36 weeks, single period)

Students enrolled in Parenting focus on assessing the impact of the parenting role in society; taking responsibility for individual growth within the parenting role; preparing for a healthy emotional and physical beginning for parent and child; meeting developmental needs of children and adolescents; building positive parent-child relationships; using positive guidance and discipline to promote self-discipline, self-respect, and socially responsible behavior; obtaining parenting information, support, and assistance; and planning ways that families and society can share in nurturing children and adolescents. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of parenting responsibilities and education are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Parenting 8231*/8232 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Resource Management 8214*/8219</li> <li>• Introduction to Culinary Arts 8249*/8250</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/ 8238</li> <li>• Introduction to Fashion Design and Marketing Occupations 8247*/8248</li> <li>• Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259</li> <li>• Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*/8255</li> <li>• Work and Family Management 8205*/8282</li> <li>• GRADS 8278</li> </ul> *18-week course	Parenting 8231*/8232 <b>and</b> any combination of one or more 18- and 36-week courses listed for concentration, equivalent to a total of three 36-week courses *18-week course	N/A	Human Services

**Resource Management 8214**

**Grade Level:** 9-12 (18 weeks, single period)

**Resource Management 8219**

**Grade Level:** 9-12 (36 weeks, single period)

Students enrolled in Resource Management focus on managing resources to achieve individual goals; making informed consumer choices; creating and maintaining a living environment that supports the well-being of individuals; living in a global environment; making decisions related to nutrition, clothing, and housing; and managing a household. Cooperative (on-the-job) education or other work-based learning opportunities\* under the supervision of the instructor are an option. Critical thinking, practical problem solving, and entrepreneurship opportunities within the area of resource management are emphasized. Teachers highlight the basic skills of math, science, and communication when appropriate in content.

\*For information, order the following downloadable files from <<http://www.cteresource.org/publications/ordering/index.html>>:

- *Career and Technical Education Cooperative Education Handbook* (8.02.07P)
- *Work-Based Learning Handbook* (8.05.04P)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Resource Management 8214*/8219 <b>and</b> a combination of one or more of the following 18-week and 36-week courses, equivalent to a total of two 36-week courses: <ul style="list-style-type: none"> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209/8210</li> <li>• Life Planning 8226*/8227</li> <li>• Nutrition and Wellness 8228*/8229</li> <li>• Parenting 8231*/8232</li> <li>• Introduction to Culinary Arts 8249*/8250</li> <li>• Introduction to Early Childhood Education and Services 8233*/8234</li> <li>• Introduction to Family and Human Services 8237*/ 8238</li> <li>• Introduction to Fashion Design and Marketing Occupations 8247*/8248</li> <li>• Introduction to Hospitality, Tourism, and Recreation Occupations 8258*/8259</li> <li>• Introduction to Housing, Home Furnishings, and Interior Design Occupations 8254*8255</li> <li>• Work and Family Management 8205*/8282</li> <li>• GRADS 8278</li> </ul> *18-week course	Resource Management 8214*/8219 <b>and</b> any combination of 18- and 36-week courses, equivalent to a total of three 36-week courses *18-week course	N/A	Human Services

### Other Family Focus Courses

#### **GRADS Family Focus FCS8277**

**Grade Levels:** 9-12 (18 weeks)

#### **GRADS Family Focus FCS8278**

**Grade Levels:** 9-12 (36 weeks)

Students enrolled in the Graduation, Reality, and Dual-role Skills Program (GRADS) concentrate on developing self-esteem; using effective communication skills; maintaining positive relationships; promoting wellness, prenatal, and postnatal care; evaluating the cost of parenthood; adjusting to parenthood; understanding child development; providing child care; managing family relationships; exploring careers; applying employability skills; managing economic resources and expenditures; and balancing work and family. Teachers highlight the basic skills of math and science when appropriate in the content.

NOTE: GRADS is reported in the Human Services family. Completer sequences and certifications do not apply.





## **Section 4: Health and Medical Sciences 2006-2007**

### **Need course information?**

- ❑ Course Descriptions
- ❑ Course Sequences
- ❑ Certifications, Licenses, and Assessments
- ❑ Career Cluster





## Section 4: Health and Medical Sciences Course Descriptions, Sequences, Certifications, Career Clusters

### Section Overview

---

This section presents course information applicable to the Health and Medical Sciences program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Middle School Course

---

**Note:** The following middle school course is listed and described in Section 12, Career Exploration and Middle School. It is reported in the Health Science career cluster. Completer sequences and certifications do not apply.

Course Title and Code	Section 12 Page
• Health and Medical Sciences Exploratory 8370	12-4

## High School Course Credit in Middle School

---

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. The Health and Medical Sciences secondary course that may be offered in middle school for high school credit is **Introduction to Health and Medical Sciences 8302**.

## Introductory Course

---

### Introduction to Health and Medical Sciences 8302

**Grade Level:** 9 or 10 (36 weeks, single period)

This course introduces the student to all health care careers and develops basic skills common to all health and medical sciences. It is recommended as the first course for the following occupational offerings: Practical Nursing I 8357, Nursing Assistant I 8360, Medical Terminology 8383.

**Note:** This course may be offered in middle school for high school credit if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Health and Medical Sciences 8302 is recommended as the first course for the following occupational offerings: <ul style="list-style-type: none"> <li>• Practical Nursing I 8357* and Practical Nursing II 8358*</li> <li>• Nursing Assistant I 8360</li> <li>• Medical Terminology 8383</li> </ul> *18-week course	N/A	N/A	Health Science

## Biomedical Technology

---

### Biotechnology Foundations 8344

**Grade Level:** 10, 11, or 12

This course focuses on various techniques that are used to modify living organisms, or parts of organisms, to improve plants and animals, and the development of microorganisms for specific purposes. Student activities range from bioprocessing and genetic engineering to medicine, biomechanical systems, and the environment. Students gain insight and understanding about biotechnology career fields.

**Note:** This course is reported in the Health Science career family. Sequence and certification information do not apply until the Biomedical Technician course is developed and approved.

### Biomedical Technician 8347

**Grade Level:** 11 or 12

**Prerequisite:** Biotechnology Foundations recommended

Course task list is published in VERSO (<http://www.cteresource.org/>). For additional information, please contact the Health and Medical Science program service at the Virginia Department of Education.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Biotechnology Foundations 8344</li> <li>• Biomedical Technician 8347</li> </ul>	N/A	N/A	Health Science

## Dental Assistant

---

### Dental Assistant I 8328

**Grade Level:** 11 (suggested) (36 weeks, double period)

**Prerequisites:** Keyboarding and Introduction to Health Occupations are strongly recommended.

Students are introduced to the careers in dentistry, including dentist (general and specialists), hygienist, dental assistant, dental laboratory technician, and dental receptionist. Students practice and learn about many of the skills utilized in these professions while attaining all the skills necessary to become a dental assistant. Study includes infection control and OSHA standards, anatomy and physiology, tooth morphology, oral histology, preventive dentistry, applied psychology, effective communication, office administration and management, use of dental software, operative dentistry techniques, and dental materials/laboratory skills.

### Dental Assistant II 8329

**Grade Level:** 12 (suggested) (36 weeks, double period)

**Prerequisite:** Dental Assistant I

Units of study include medical emergencies, coronal polishing, oral pathology, dental roentgenology, nutrition, schedule IV drugs and pharmacology, and advanced laboratory techniques. While attending classes for part of the week, students also have an opportunity to participate in internships in local private dental offices and public health dental facilities, where they participate in all phases of dental care delivery. At the completion of the program, students are State Dental Board certified in Radiation Hygiene and Safety and in Schedule IV Drugs and are qualified to work as dental assistant, dental receptionist, patient educator, appointment controller, and dental office manager. After two years in the field, graduates of the program are eligible to take the national examination to become a certified Dental Assistant. Many graduates choose to continue their dental education at community colleges and universities.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"><li>Dental Assistant I 8328</li><li>Dental Assistant II 8329</li></ul>	N/A	Available upon completion of Dental Assistant II 8329: <ul style="list-style-type: none"><li>Certified Dental Assistant: Infection Control Examination (Dental Assisting National Board)</li><li>Certified Dental Assistant: Radiation Health &amp; Safety Examination (Dental Assisting National Board)</li><li>Dental Assisting Assessment (NOCTI)</li><li>NRDA Certification (National Allied Health Registry/National Association for Health Professionals)</li></ul>	Health Science

## Emergency Medical Technology

### Emergency Medical Technician-B I 8333

**Grade Level:** 11 (36 weeks, double period)

Students focus on the role and responsibilities of emergency rescue workers, basic medical terminology, and health care skills that include first aid; cardiopulmonary resuscitation; aseptic technique; and related anatomy, physiology, and disease knowledge. Supervised work education is provided in a hospital or with rescue squads and is managed by the HOE teacher.

### Emergency Medical Technician-B II 8334

**Grade Level:** 12 (36 weeks, double period)

**Prerequisite:** EMT-BI 8333

Students become skilled in identifying and dealing with emergencies such as bleeding, fractures, airway obstruction, and cardiac arrest. Instruction emphasizes proper care and use of common emergency equipment and safe methods for lifting, moving, and transporting injured persons. Supervised on-the-job training and patient-care experiences are part of the instructional program. Program completers may take the EMT state certification examination administered by the Virginia Department of Health.

### Emergency Medical Technician-B III 8335

**Grade Level:** 12

**Prerequisite:** EMT-BII 8334

This course will allow students to strengthen the skills acquired in the basic course and build on their certification level with additional certifications and mentored experience. Students will serve as liaisons with other public safety services (fire control, law enforcement, emergency management). Units of instruction include the following:

- Review of EMT-Basic skills (medical, trauma, environmental)
- Pharmacology and drug dosage calculations
- Terrorist awareness and weapons of mass destruction
- Basic trauma life support certification
- Instructional theory—development of lesson plans
- Use of A/V public speaking equipment
- Mentorship

**Mentorship/field rotations:** This course requires a clinical mentorship for development of proficiency in patient skills. An assigned mentor will evaluate field performance and document basic skill competency.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"><li>• Emergency Medical Technician-B I 8333</li><li>• Emergency Medical Technician-B II 8334</li></ul>	<ul style="list-style-type: none"><li>• Emergency Medical Technician-B I 8333</li><li>• Emergency Medical Technician-B II 8334</li><li>• Emergency Medical Technician-B III 8335</li></ul>	Certification available upon completion of EMT-B II 8334: Emergency Medical Technician (Virginia Department of Health)	Health Science

## Health Careers Cluster

---

### Health Assistant I 8331

**Grade Level:** 11 (36 weeks, double period)

Students explore careers in the allied health field by developing basic skills common to several assisting careers. They study body structure and function, principles of health, microbes and disease, and an overview of the national health and patient care system. Supervised work education or on-the-job training may begin as part of the course in hospitals, nursing homes, or public health agencies and is managed by the HOE teacher.

### Health Assistant II 8332

**Grade Level:** 12 (36 weeks, triple period)

**Prerequisite:** Health Assistant I

Students choose advanced preparation in one of the four tracks—dental, allied health, medical, or nursing—for further classroom instruction and clinical practice. Course content is based on validated competencies for a specific worker such as dental aide, medical assistant, physical therapy aide, or respiratory therapy assistant. Students achieve advanced skills in assisting with therapeutic and emergency measures, patient rehabilitation, care of the elderly; preparing the patient for examination; and performing simple laboratory procedures and health tests. Students prepare to assist physicians, dentists, nurses, and/or therapists in hospitals, nursing homes, clinics, and public health facilities in such jobs as orderly, sterile supply aide, and physical therapy aide. Successful completion may prepare students to take the exam for Certified Nurse Aide and employment in areas such as certified nursing assistant, dental aide, and respiratory therapy assistant.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Health Assistant I 8331</li> <li>Health Assistant II 8332</li> </ul>	N/A	Available upon completion of Health Assistant II: <ul style="list-style-type: none"> <li>Nurse Aide (Virginia Board of Nursing)</li> <li>Health Assisting Assessment (NOCTI)</li> <li>Home Health Aide Assessment (NOCTI)</li> <li>Nursing Assisting Assessment (NOCTI)</li> <li>National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)</li> </ul>	Health Science

## Medical Assistant

### Medical Assistant I 8345

**Grade Level:** 11 (suggested) (36 weeks, double-period)

**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Students develop basic skills and techniques to assist the physician in the following areas: receptionist duties, patient examinations, cardio-pulmonary resuscitation, and simple laboratory tests. On-the-job clinical instruction may occur in physicians' offices or clinics and is coordinated by the Health and Medical Sciences teacher.

### Medical Assistant II 8346

**Grade Level:** 12 (suggested) (36 weeks, triple period)

**Prerequisites:** Medical Assistant I

Students further develop medical-assisting skills and techniques learned in Medical Assistant I. They also learn medical economics; assembly and maintenance of patient records; care of equipment; special diagnostic testing such as EKG, visual, and audio testing machines; and assistance with office therapy. Advanced on-the-job clinical experience in physicians' offices or clinics is a part of the course. Successful completion of the program leads to employment in physicians' offices or clinics. Keyboarding is recommended.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Medical Assistant I 8345</li> <li>Medical Assistant II 8346</li> </ul>	N/A	Available upon completion of Medical Assistant II 8346: <ul style="list-style-type: none"> <li>Medical Assisting Assessment (NOCTI)</li> <li>NRDA Certification (National Allied Health Registry/National Association for Health Professionals)</li> </ul>	Health Science

## Medical Terminology

---

### Medical Terminology 8383

**Grade Levels:** 10-12 (18 weeks)

**Prerequisite:** None—Introduction to Health and Medical Sciences is strongly recommended.

Medical Terminology is designed to help students learn health care language and is presented in logical order, beginning with each body system's anatomy and physiology and progressing through pathology, diagnostic procedures, therapeutic interventions, and finally pharmacology. Concepts, terms, and abbreviations for a topic are also presented to the students.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"><li>• Introduction to Health and Medical Sciences 8302 and</li><li>• Medical Terminology 8383</li></ul>	N/A	N/A	Health Science

## Nurse Aide

---

### Nurse Aide I 8360

**Grade Level:** 11 or 12 (36 weeks)

**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Nurse Aide I, offered as a single-, double-, or triple-period occupational preparation course at the 11th-grade level, emphasizes the study of nursing occupations as related to the health care system. Students study normal growth and development, simple body structure and function, and medical terminology and are introduced to microbes and disease. They receive elementary skill training in patient-nursing assistant relationships; taking and recording of vital signs; cardiopulmonary resuscitation; and bathing, feeding, dressing, and transporting of patients in hospitals and nursing homes. Limited on-the-job instruction in nursing homes and hospitals is part of the course. This course can be used as an introduction to practical nursing or to prepare the student for Nurse Aide II so that all competencies for a certified nursing assistant are met.

### Nurse Aide II 8362

**Grade Level:** 12 (suggested)(36 weeks)

**Prerequisites:** Nurse Aide I

Nurse Aide II is a double- or triple-period occupational preparation course, emphasizing advanced skill training in areas such as catheter care, range of motion, bowel and bladder training, care of the dying, selected procedures for maternal and infant care, and admission and discharge procedures. Students learn diseases and body systems as related to advanced clinical care of the acute medical-surgical patient, the chronically ill, and the elderly. On-the-job instruction in a licensed nursing home is part of the course. Upon completion of the nurse aide program, the student is eligible to take the nurse aide certification exam that leads to employment as a certified nurse aide in hospitals and nursing homes.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Nurse Aide I 8360</li> <li>Nurse Aide II 8362</li> </ul>	N/A	Available upon completion of Nurse Aide II 8362: <ul style="list-style-type: none"> <li>Health Assisting Assessment (NOCTI)</li> <li>Home Health Aide Assessment (NOCTI)</li> <li>Nursing Assisting Assessment (NOCTI)</li> <li>Nurse Aide (Virginia Board of Nursing)</li> <li>National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)</li> </ul>	Health Science

## Pharmacy Technician

### Pharmacy Technician I 8305

### Pharmacy Technician II 8306

**Grade Levels:** 11 or 12 (18 weeks each)

The certificate program is designed to provide students the basic skills and knowledge to begin work as a Pharmacy Technician. The coursework will fulfill the requirements of the Board of Pharmacy and prepare students to take either the state examination or the national examination administered by the Pharmacy Technician Certification Board. Trained, experienced pharmacy technicians who can demonstrate the right skills and knowledge should be able to pursue many exciting and respected career options or postsecondary study in the field of pharmacy.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Pharmacy Technician I 8305</li> <li>Pharmacy Technician II 8306</li> </ul>	N/A	Available upon completion of Pharmacy Technician 8305: Virginia Pharmacy Technician Examination (Virginia Board of Pharmacy)	Health Science

## Physical/Occupational Therapy

### Physical/Occupational Therapy 8385

**Grade Level:** 11 or 12 (36 weeks, 1 or 2 class periods for 1 or 2 credits)

**Prerequisites:** Algebra, Biology

The course is designed to provide an introduction to the professions of physical and occupational therapy. Students explore the principles and practices of therapists in the health care industry and participate in a clinical internship under the direct supervision of a licensed physical and/or occupational therapist. Clinical skills in the areas of physical therapy and occupational therapy enable students to gain experience in rehabilitative care, which is practiced throughout the continuum of care and across the life span of individuals. After successful completion of this course, students are prepared for employment as rehabilitation technicians or may seek higher education for specific degrees in a variety of fields such as physical therapy, occupational therapy, speech therapy, sports medicine, athletic training, chiropractic medicine, biology, or exercise physiology.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Physical/Occupational Therapy 8365 (double-period class)	N/A	N/A	Health Science

## Practical Nursing

### Practical Nursing I 8357

**Grade Level:** 11 (suggested)(18 weeks)

**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Students learn nursing care of patients of all ages, in various stages of sickness or wellness, and with a variety of disease conditions. They focus on human anatomy, body function, communication, community health, fundamental nursing skills, nutrition, drug therapy, and elementary medical-surgical nursing.

### Practical Nursing II 8358

**Grade Level:** 12 (18 weeks)

**Prerequisites:** Practical Nursing I

Instruction emphasizes introduction to pharmacology, normal life span (human growth and development), normal nutrition, nursing fundamentals, and nursing trends. Advanced emergency procedures and application of nursing procedures are demonstrated in a laboratory setting.

### Practical Nursing III 8359

**Grade Level:** Adult, 13 (36 weeks, full-time)

**Prerequisite:** Practical Nursing II

Classroom instruction and clinical training are given in approved hospitals, licensed nursing homes, or home-care settings under the direction of a nurse educator. Instruction emphasizes administration of medicines, advanced and complex patient care, and practice with patients of all ages. Students learn advanced anatomy, physiology, and human behavior as related to health and disease, including mental illness. Upon successful completion of the total program, students qualify to take the practical nurse licensing examination.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Practical Nursing I 8357*</li> <li>• Practical Nursing II 8358*</li> <li>• Practical Nursing III 8359</li> </ul> <p><i>*18-week course</i></p>	N/A	Upon completion of Practical Nursing II: <ul style="list-style-type: none"> <li>• Nurse Aide (Virginia Board of Nursing)</li> <li>• Health Assisting Assessment (NOCTI)</li> <li>• Home Health Aide Assessment (NOCTI)</li> <li>• Nursing Assisting Assessment (NOCTI)</li> <li>• National Health Care Foundation Skills Standards Assessment (National Consortium on Health Science and Technology Education/NOCTI)</li> </ul>	Health Science

## Surgical Technology

---

### Surgical Technologist I 8351

**Grade Level:** 12 (36 weeks, triple period)

**Prerequisites:** None—Introduction to Health and Medical Sciences or Nursing Assistant I is recommended.

Students acquire knowledge and assisting-level skills to function in association with licensed nurses and surgeons/physicians, providing the best possible care of the surgical patient. Instruction emphasizes human anatomy, medical terminology, cleanliness, asepsis, safety, and efficiency in the operating room.

### Surgical Technologist II 8352

**Grade Level:** Adult, 13 (suggested) (4 months, full-time)

**Prerequisites:** Surgical Technologist I

Classroom instruction and clinical training are given in selected approved hospitals under the direction of a nurse educator. Students learn operating room procedures and aseptic surgical techniques, including preparation and handling of materials and surgical instruments at the operating table. Upon successful completion of the program, students qualify to take the national certification exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"><li>Surgical Technologist I 8351</li><li>Surgical Technologist II (Adult) 8352</li></ul>	N/A	N/A	Health Science

## Veterinary Assistant

---

### Veterinary Assistant Level I 8310

**Grade Levels:** 10-12 (36 weeks, double or triple period)

**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Students learn animal science and the care of animals, including animal structure and function, principles of health, and microbes and disease. They develop basic skills and techniques of assisting the veterinarian in the following areas: receptionist duties; animal examinations; examining room and laboratory work; the handling, caring, and feeding of animals; first aid and surgery; and maintenance of equipment and facilities. On-the-job clinical instruction may occur in veterinary offices or animal clinics and is coordinated by the Health and Medical Sciences teacher.

### Veterinary Assistant Level II 8311

**Grade Levels:** 11-12 (36 weeks, double or triple period)

**Prerequisites:** Veterinary Assistant Level I

The student may incorporate a cooperative work experience that combines classroom instruction with two or three hours of school-released time for on-the-job training in a health care facility such as a veterinarian's office or clinic.

### Veterinary Assistant Level III 8312

**Grade Level:** 12 (36 weeks, double or triple period)

**Prerequisites:** Veterinary Assistant Level II

The student will incorporate advanced classroom instruction with two or three hours of release time for on-the-job experience.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Veterinary Assistant Level I 8310</li> <li>Veterinary Assistant Level II 8311</li> </ul>	<ul style="list-style-type: none"> <li>Veterinary Assistant Level I HMS8310</li> <li>Veterinary Assistant Level II HMS8311</li> <li>Veterinary Assistant Level III HMS8312</li> </ul>	N/A	Agriculture, Food, and Natural Resources

## Occupational Mix (with Family and Consumer Sciences)

### Home Health Aide 8364

**Grade Levels:** 11, 12

**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Home Health Aide is designed as an “occupational mix” program that provides entry-level skills within the health-related field. It provides students with the knowledge, understanding, and basic skill training necessary for entering advanced Health and Medical Sciences programs or locating entry-level employment as a certified nurse’s aide/home health aide in a hospital, nursing home, home for adults, private home, or other health care setting. To ensure maximum skills and employment opportunities, the curriculum is designed to be taught by both Health and Medical Sciences and the Family and Consumer Sciences teachers. Access to a clinical training facility is essential. Home Health Aide may be offered as a three-hour block senior intensified program or may, as a local option, be scheduled as a two-year, two-hour block at grades 11 and 12.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Home Health Aide 8364</li> <li>Family and Human Services I 8264</li> </ul>	<ul style="list-style-type: none"> <li>Home Health Aide 8364</li> <li>Introduction to Family and Human Services 8237/8238</li> <li>Family and Human Services I 8264</li> </ul> <p><b>or</b></p> <ul style="list-style-type: none"> <li>Home Health Aide 8364</li> <li>Family and Human Services I 8264</li> <li>Family and Human Services II 8265</li> </ul>	N/A	Health Science

## Special Programs

### Health and Medical Sciences Dual Enrollment—Postsecondary 8394

For information, please contact the Health and Medical Sciences program service, Virginia Department of Education.





## **Section 5: Marketing 2006-2007**

### **Need course information?**

- ❑ Course Descriptions
- ❑ Course Sequences
- ❑ Certifications, Licenses, and Assessments
- ❑ Career Clusters





## Section 5: Marketing Course Descriptions, Sequences, Certifications, Career Clusters

### Section Overview

---

This section presents course information applicable to the Marketing program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, ways to earn the credential, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career families are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Middle School Course

---

**Note:** The following middle school course is listed and described in Section 12, Career Exploration and Middle School. It is reported in the Marketing, Sales, and Service career cluster. Completer sequences and certifications do not apply.

Course Title and Code	Section 12 Page
• Make It Your Business 8109, 8112, 8113, 8114	12-5

## High School Course Credit in Middle School

---

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. The Marketing secondary course that may be offered in middle school for high school credit is **Principles of Business and Marketing 8115**.

## General Marketing

### Fundamentals of Marketing 8110

**Grade Level:** 10 (36 weeks)

Fundamentals of Marketing is a basic elective course offered in the three-year Marketing program. Students gain a basic understanding of marketing and its importance and develop fundamental social, economic, mathematical, marketing, job search, and occupational decision-making skills necessary for successful initial employment in retail, wholesale, or service businesses. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Fundamentals of Marketing may be included in addition to any two 36-week course sequences for any of the following: <ul style="list-style-type: none"> <li>• General Marketing</li> <li>• Executive Marketing</li> <li>• Apparel and Accessories Marketing</li> <li>• Hospitality, Tourism, and Recreation Marketing</li> </ul>	N/A	N/A	Marketing, Sales, and Service

### Internet Marketing 8125 (oe)

**Grade Levels:** 11, 12

Students learn about the paperless exchange of business and marketing information, using technology (e.g., Internet, e-mail, electronic data interchange, and electronic funds transfer). Included in this course is an overview of the technology of Web servers, clients, and net infrastructure and the background of this fast-growing market; the economics of electronic markets; marketing research; advertising on the Web and Web page basics; pricing information; security and encryption; and on-line business opportunities. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Internet Marketing 8125</li> <li>• Advanced Marketing 8130/8131</li> </ul>	<ul style="list-style-type: none"> <li>• Internet Marketing 8125 <b>and</b></li> <li>• Advanced Marketing 8130/8131 <b>and</b></li> <li>• Marketing Management 8132</li> </ul>	Available upon completion of Internet Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Marketing, Sales, and Service
<ul style="list-style-type: none"> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>			

### Introduction to Marketing 8111

**Grade Level:** 10 (18 weeks)

Students gain basic knowledge about marketing and its importance and basic skills important for entry-level marketing employment. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Introduction to Marketing may be included in addition to any two 36-week course sequences for any of the following: <ul style="list-style-type: none"> <li>• General Marketing</li> <li>• Executive Marketing</li> <li>• Apparel and Accessories Marketing</li> <li>• Hospitality, Tourism, and Recreation Marketing</li> <li>• Financial Services Marketing</li> </ul>	N/A	N/A	Marketing, Sales, and Service

**Make It Your Business 8109**

**Grade Levels:** 6, 7, 8, 9 (6 weeks)

**Make It Your Business 8112**

**Grade Levels:** 6, 7, 8, 9 (9 weeks)

**Make It Your Business 8113**

**Grade Levels:** 6, 7, 8, 9 (12 weeks)

**Make It Your Business 8114**

**Grade Levels:** 6, 7, 8, 9 (18 weeks)

Students are provided opportunities to run a small group or class business based on their own design for providing a service or product needed at their school. They learn business terminology, basic entrepreneurship concepts, and fundamental business operating principles in this course. Design of course content allows for interdisciplinary instruction. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Make It Your Business may be included in addition to any two 36-week course sequences for any of the following: <ul style="list-style-type: none"> <li>• General Marketing</li> <li>• Executive Marketing</li> <li>• Apparel and Accessories Marketing</li> <li>• Hospitality, Tourism, and Recreation Marketing</li> <li>• Financial Services Marketing</li> </ul>	N/A	N/A	Marketing, Sales, and Service

**Marketing 8120 (co-op)**

**Marketing 8121 (oe)**

**Grade Levels:** 11, 12 (36 weeks)

Students are introduced to functions and foundations involved in the marketing of goods, services, and ideas and achieve skills necessary for successful marketing employment. Students study risk management, selling, promotion, pricing, purchasing, marketing-information management, product/service planning, distribution, and financing. Foundation skills include economics, human resources, and marketing and business necessary for success in marketing occupations. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

**Advanced Marketing 8130 (co-op)**

**Advanced Marketing 8131 (oe)**

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Marketing 8120/8121

Students continue to gain knowledge of marketing functions and foundations as they relate to supervisory and management responsibilities and develop skills needed for advancement. They develop skills for supervisory positions and/or for continuing education in a marketing-related field. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Marketing 8120/8121</li> <li>Advanced Marketing 8130/8131</li> </ul>	Marketing 8120/8121 <b>and</b> Advanced Marketing 8130/8131 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>Internet Marketing 8125</li> <li>Marketing Management 8132</li> </ul>	Available upon completion of Marketing 8120/8021: <ul style="list-style-type: none"> <li>Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul> Available upon completion of Advanced Marketing 8130/8131: <ul style="list-style-type: none"> <li>Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>National Professional Certification in Customer Service (National Retail Federation Foundation)</li> <li>Retail Trades Assessment (NOCTI)</li> </ul>	Marketing, Sales, and Service
Marketing 8120/8121 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>Internet Marketing 8125</li> <li>Marketing Management 8132</li> </ul>			

**Principles of Business and Marketing 8115**

**Grade Levels:** 9, 10 (36 weeks)

**Principles of Business and Marketing 8116**

**Grade Levels:** 9, 10 (18 weeks)

Students explore the roles of business and marketing in the free enterprise system and the global economy. Students study how the American economy operates and prepare to make decisions as consumers, wage earners, and citizens.

**Note:** This high school course may be offered to middle school students if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Principles of Business and Marketing 8115/8116 is a part of the General Marketing sequence and may be included with other marketing courses but does not count toward a concentration sequence.	N/A	N/A	Marketing, Sales, and Service

## Executive Marketing

### Global Marketing and Commerce 8135 (oe)

**Grade Levels:** 11, 12 (36 weeks)

**Prerequisites:** None (It is recommended that students be enrolled in a foreign language course either concurrently or prior to enrolling in this course.)

Global Marketing and Commerce is a specialized course for students with a career interest in the field of international trade. Students gain an understanding of the various careers in global trade, finance, shipping, and marketing and consider fundamental concepts, principles, and theories of marketing in an international setting. Course content blends macroeconomic and microeconomic theory with international culture, politics, legal issues, concepts, practices, and applications. Internships may be available to provide students with additional opportunities for "hands-on" experiences in international marketing. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

### Advanced Global Marketing and Commerce 8136 (oe)

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Completion of Marketing 8120 or 8121 or Global Marketing and Commerce 8135 (It is recommended that students be enrolled in a foreign language course either concurrently or prior to enrolling in this course.)

Advanced Global Marketing and Commerce, a specialized course for students with a career interest in international trade, builds upon concepts learned in Global Marketing and Commerce (8135). Economic and international trade concepts are reviewed, and the world environment of international trade is further explored. Students expand their knowledge about the impact of culture on international trade and continue their study of the legal and political aspects of international marketing. Global product strategies are examined. Concepts detailing entry into international markets, pricing strategies, international promotion, and marketing research are studied. Computer/technology applications supporting international marketing are explored. A review of skills and preparation required for careers in international marketing complete this course. Internships that provide "hands-on" opportunities in the international area may be available to students. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Global Marketing and Commerce 8135 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Advanced Global Marketing and Commerce 8136</li> <li>• Internet Marketing 8125</li> </ul>	N/A	Available upon completion of Global Marketing and Commerce <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul> Available upon completion of Advanced Global Marketing and Commerce: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Marketing, Sales, and Service

### Marketing Management 8132 (oe)

**Grade Level:** 12 (36 weeks)

High school seniors who plan to attend college with a concentration in marketing, business, or management and/or who have tentative plans to manage or own a business will benefit from this course. Students develop critical-thinking and decision-making skills through the application of marketing principles to (a) small and large businesses, (b) nonprofit organizations, (c) the professions, (d) service industries, and (e) other institutions or associations that market products, services, ideas, or people. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Marketing Management 8132 and one of the following: <ul style="list-style-type: none"> <li>• Internet Marketing 8125</li> <li>• Marketing 8130/8131</li> </ul>	N/A	Available upon completion of Marketing Management: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> <li>• Retail Trades Assessment (NOCTI)</li> </ul>	<ul style="list-style-type: none"> <li>• Marketing, Sales, and Service</li> <li>• Business, Management, and Administration</li> </ul>

### Exploring Entrepreneurship 9093

**Grade Levels:** 9, 10, 11, 12 (18 weeks)

Students explore qualities of individual enterprise or the art of succeeding in a career. They develop skills needed to advance in an ever-changing work environment. Specifically, students develop competencies in decision making, long-range planning, effective communication, accountability, responsibility, and continuing education. Both individual development and business plan development are examined as concurrent career pathways.

### Entrepreneurship Education 9094

**Grade Levels:** 11, 12 (36 weeks)

This course is designed for students who wish to concentrate on strategies for career development through ownership/management of their own businesses. Although individual skills are emphasized, the focus of the course is on development of a business plan, including the following: Determination of type of business enterprise, legal considerations, location selection, financing, steps in getting the enterprise started, marketing strategy, and interaction with successful entrepreneurs.

Entrepreneurship courses may be included in many sequences to provide opportunities for students to investigate or prepare for business ownership. More information is available from the Career Connections service area, Virginia Department of Education.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Entrepreneurship courses may be included in addition to any two 36-week course sequences for any of the following: <ul style="list-style-type: none"> <li>• General Marketing</li> <li>• Executive Marketing</li> <li>• Apparel and Accessories Marketing</li> <li>• Hospitality, Tourism, and Recreation Marketing</li> <li>• Financial Services Marketing</li> </ul>	N/A	N/A	Marketing, Sales, and Service

## **Fashion Marketing**

---

### **Introduction to Fashion Design and Marketing 8148/8149**

**Grade Levels:** 10, 11, 12 (18/36 weeks)

The marketing and fashion design competencies in this course focus on identifying and exploring individual careers within the fashion design, manufacturing, and marketing industry. Units of study include the relationships that exist among all areas of the clothing industry; related global and economic issues; exploration of careers in color, design, and finishing; auxiliary fashion industries; clothing maintenance, alterations, and repair; entrepreneurial opportunities in related areas; and the skills and characteristics necessary for success in careers in the textile, design, apparel production, and fashion marketing industries. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

### **Fashion Marketing 8140 (co-op)**

#### **Fashion Marketing 8141 (oe)**

**Grade Levels:** 11, 12 (36 weeks)

In this specialized course, students gain basic knowledge of the apparel and accessories industry and skills necessary for successful employment in apparel businesses. Students develop general marketing skills necessary for successful employment in fashion marketing, general marketing skills applicable to the apparel and accessories industry, and specialized skills unique to fashion marketing. Personal selling, sales promotion, purchasing, physical distribution, market planning, and product/service technology as well as academic skills (mathematics, science, English, and history/social science) related to the content are part of this course. Computer/technology applications supporting this course are studied.

### **Advanced Fashion Marketing 8145 (co-op)**

#### **Advanced Fashion Marketing 8146 (oe)**

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Marketing 8120/8121 or Fashion Marketing 8140/8141

Students with a career interest in apparel and accessories marketing gain in-depth knowledge of the apparel and accessories industry and skills important for supervisory-management employment in apparel businesses. They develop advanced skills unique to fashion marketing and advanced general marketing skills applied to the apparel and accessories industry. Professional selling, sales promotion, buying, merchandising, marketing research, product/service technology, and supervision as well as academic skills (mathematics, science, English, and history/social science) related to the content are part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Introduction to Fashion Design and Marketing 8149 <b>and</b></li> <li>• Fashion Marketing 8140/8141 <b>and</b></li> <li>• Advanced Fashion Marketing 8145/8146</li> </ul>	N/A	<p>Available upon completion of Fashion Marketing:</p> <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certification (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul> <p>Available upon completion of Advanced Fashion Marketing:</p> <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certification (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certification (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> <li>• Retail Trades Assessment (NOCTI)</li> </ul>	Marketing, Sales, and Service

## Hospitality, Tourism, and Recreation Marketing

### Hotel/Motel Marketing 8160 (co-op)

#### Hotel/Motel Marketing 8161 (oe)

**Grade Levels:** 11, 12 (36 weeks)

In this specialized course, students with a career interest in the field of hospitality and recreation develop skills in the areas of hotel front-office procedures, human relations, food and beverage service, purchasing, tourism, travel, and sales promotion. In addition, students obtain a thorough understanding of the hotel-motel industry and the career options available. Academic skills (mathematics, science, English, and history/social science) related to the content are part of this course. Computer/technology applications supporting this course are studied.

### Advanced Hotel/Motel Marketing 8162 (co-op)

#### Advanced Hotel/Motel Marketing 8163 (oe)

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Hotel/Motel Marketing 8160/8161

Students gain in-depth knowledge of the marketing functions within the hotel-motel industry and the management responsibilities for those functions. They develop advanced skills in the area of hotel-motel operation in which they choose to specialize.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Hotel/Motel Marketing 8160/8161 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Advanced Hotel/Motel Marketing 8162/ 8163</li> <li>• Internet Marketing 8125</li> <li>• Advanced Marketing 8130/i131</li> <li>• Marketing Management 8132</li> </ul>	<ul style="list-style-type: none"> <li>• Hotel/Motel Marketing 8160/8161 <b>and</b></li> <li>• Advanced Hotel/Motel Marketing 8162/8163 <b>and</b> one of the following:</li> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>	Available upon completion of Hotel/Motel Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate</li> <li>• Lodging Management Program Certification, Level 1 (AH&amp;LA)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> <li>• START Certification (AH&amp;LA)</li> </ul> Available upon completion of Advanced Hotel/Motel Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate</li> <li>• Lodging Management Program Certification, Level 2 (AH&amp;LA)</li> <li>• Hospitality Management—Food &amp; Beverage Assessment (NOCTI)</li> <li>• Hospitality Management—Lodging Option Assessment (NOCTI)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> <li>• START Certification (AH&amp;LA)</li> </ul>	Hospitality and Tourism

**Sports, Entertainment, and Recreation Marketing 8175 (co-op)**

**Sports, Entertainment, and Recreation Marketing 8176 (oe)**

**Grade Levels:** 10, 11, 12 (36 weeks)

Students develop skills in the areas of marketing analysis, event marketing, communication, and human relations, along with a thorough understanding of the sports, entertainment, and recreation industry and career options available. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

**Advanced Sports, Entertainment, and Recreation Marketing 8177 (co-op)**

**Advanced Sports, Entertainment, and Recreation Marketing 8178 (oe)**

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Sports, Entertainment, and Recreation Marketing 8175/8176

Students will continue their study of the sports, entertainment, and recreation industry including the impact of Internet marketing and international marketing in this area. Other topics include market research, market segmentation, and sponsorships as well as planning, implementing, and evaluating SER events. Also covered will be working with agents and personal managers and appraising the role of labor unions in SER. Additional study will be focused on developing a career plan in the

sports, entertainment, and recreation area. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Sports, Entertainment, and Recreation Marketing 8175/8176 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Advanced Sports, Entertainment, and Recreation Marketing 8177/8178</li> <li>• Advanced Marketing 8130/8131</li> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>	Sports, Entertainment, and Recreation Marketing 8175/8176 <b>and</b> Advanced Sports, Entertainment, and Recreation Marketing 8177/8178 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>	Available upon completion of Sports, Entertainment, and Recreation Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul> Available upon completion of Advanced Sports, Entertainment, and Recreation Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Hospitality and Tourism

**Travel and Tourism Marketing 8165 (co-op)**

**Travel and Tourism Marketing 8166 (oe)**

**Grade Levels:** 11, 12 (36 weeks)

Students develop skills in the areas of communication, human relations, mathematics, creative selling, sales promotion, industry technology, and market research. They learn computerized systems used by major airlines and travel agencies. In addition, students obtain a thorough understanding of the travel and tourism industry and the career options available. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

**Advanced Travel and Tourism Marketing 8167 (co-op)**

**Advanced Travel and Tourism Marketing 8168 (oe)**

**Grade Level:** 12 (36 weeks)

**Prerequisite:** Travel and Tourism Marketing 8165 or 8166

Students gain in-depth knowledge of the marketing functions within the travel-tourism industry and the management responsibilities for those functions. They develop advanced competencies in the areas of communication, human relations, mathematics, creative selling, promotion, industry technology, and marketing research. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Travel/Tourism Marketing 8165/8166 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Advanced Travel/Tourism Marketing 8167/8168</li> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>	Travel/Tourism Marketing 8165/8166 and Advanced Travel/Tourism Marketing 8167/8168 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> </ul>	Available upon completion of Travel and Tourism Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul> Available upon completion of Advanced Travel and Tourism Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Hospitality and Tourism

## Financial Services Marketing

### Financial Services Marketing 8180 (co-op)

### Financial Services Marketing 8181 (oe)

**Grade Levels:** 11, 12 (36 weeks)

In this specialized course, students with a career interest in the financial services marketing field gain an understanding of the financial services marketing industry, with emphasis in the areas of monetary systems; types of financial institutions; careers in finance; the Federal Reserve System; negotiable instruments; and advertising and public relations associated with this field. Skills necessary for entry-level employment in this industry include mathematics, oral and written communication, and accounting procedures. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Financial Services Marketing 8180/8181 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Advanced Marketing 8130/8131</li> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> <li>• International Marketing 8135</li> </ul>	N/A	Available upon completion of Financial Services Marketing: <ul style="list-style-type: none"> <li>• Fundamental Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• Advanced Concepts of Business and Marketing Certificate (ASK Institute)</li> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Finance

## Real Estate Marketing

---

### Real Estate Marketing 8191 (oe)

**Grade Level:** 12 (36 weeks)

Students gain skills related to sales, real estate financing, ownership rights, investments, ethics, and 60 hours of Real Estate Principles (requirements for admission to the Virginia Real Estate exam). Upon successful completion of the course, taught by an instructor approved by the Marketing program and the Virginia Real Estate Commission, students are eligible to take the Virginia real estate licensing exam. Academic skills (mathematics, science, English, and history/social science) related to the content are a part of this course. Computer/technology applications supporting this course are studied.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Real Estate Marketing 8191 <b>and</b> one of the following: <ul style="list-style-type: none"><li>• Marketing 8120/8121</li><li>• Internet Marketing 8125</li><li>• International Marketing 8135</li><li>• Marketing Management 8132</li><li>• One of the Hospitality, Tourism, and Recreation Marketing courses</li></ul>	N/A	License examination available upon completion of Real Estate Marketing: Real Estate Salesperson (Virginia Real Estate Board)	Marketing, Sales, and Service

## Special Program

---

### Marketing Dual Enrollment with Postsecondary 8198

For information, please contact the Marketing Program Specialist, Virginia Department of Education.





## **Section 6: Technology Education 2006-2007**

### **Need course information?**

- Course Descriptions
- Course Sequences
- Certifications, Licenses, and Assessments
- Career Clusters





## Section 6: Technology Education Course Descriptions, Sequences, Certifications, Career Clusters

### Section Overview

---

This section presents course information applicable to the Technology Education program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career family to each course. The family is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Middle School Courses

---

**Note:** Careers and You is reported in the Education and Training career cluster; Introduction to Technology, Inventions and Innovations, and Technological Systems are reported in the Science, Technology, Engineering, and Mathematics career cluster. Completer sequences and certifications do not apply.

Course Title and Code	Section 12 Page
• Careers and You 8475	12-5
• Introduction to Technology 8483, 8482, 8484, 8481	12-5
• Inventions and Innovations 8464, 8461, 8485	12-5
• Technological Systems 8462, 8463, 8486	12-6

## High School Course Credit in Middle School

---

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. The Technology Education secondary courses that may be offered in middle school for high school credit are **Geospatial Technology 8423**, **Materials and Processes Technology 8433**, and **Technology Foundations 8403**.

## **Design and Technology**

---

### **Technology Foundations 8403**

**Grade Level:** 9, 10, 11, or 12 (36 weeks)

### **Technology Foundations 8402**

**Grade Level:** 9, 10, 11, or 12 (18 weeks)

In the beginning high school course in the Design and Technology program, students acquire a foundation in technological material, energy, and information and apply processes associated with the technological thinker. Challenged by laboratory activities, students create new ideas and innovations, build systems, and analyze technological products to learn further how and why technology works. They work in groups to build and control systems with engineering in the development of a technology.

### **Technology Transfer 8405**

**Grade Level:** 10, 11, or 12 (36 weeks)

### **Technology Transfer 8404**

**Grade Level:** 10, 11, or 12 (18 weeks)

**Prerequisite:** Technology Foundations

Students work with a variety of computers, materials, and systems to improve their skills and knowledge. Groups work together, applying math, science, and communication concepts, on a project that combines systems such as production, energy, communication, transportation, biotechnology, and other technologies. Thematic activities engage students in community problems where they transfer the technological method to address recycling, space exploration, and housing.

### **Technology Assessment 8407**

**Grade Level:** 11 or 12 (36 weeks)

### **Technology Assessment 8406**

**Grade Level:** 11 or 12 (18 weeks)

**Prerequisite:** Technology Transfer

Technology Assessment is offered as a capstone course for students in high school. Students use their knowledge and abilities in math, science, and technology to analyze the contributions of technical devices to their homes and the world. Students use information they acquire through library research or computer databases to predict the future. They design futuristic products and use assessment to determine possible results. They also use computer graphics, videotapes, and design portfolios to present their newly created products and systems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Technology Foundations 8403 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Technology Transfer 8405</li> <li>• Technology Assessment 8407</li> </ul>	<ul style="list-style-type: none"> <li>• Technology Foundations 8403</li> <li>• Technology Transfer 8405</li> <li>• Technology Assessment 8407</li> </ul>	N/A	Science, Technology, Engineering, and Mathematics
	Technology Foundations 8403 <b>and</b> two courses from following programs: <ul style="list-style-type: none"> <li>• Pre-Engineering Program</li> <li>• Communication and Information Technology Program</li> <li>• Control Technology Program</li> <li>• Production Technology Program</li> <li>• Technical Design and Illustration Program</li> <li>• Biotechnology Program</li> </ul>		

## Engineering, Option 1

### Introduction to Engineering 8490

**Grade Level:** 10, 11, or 12 (36 weeks)

While undergoing an orientation to the careers and challenges of engineering, students are actively involved with high-tech devices, engineering graphics, and mathematical concepts and scientific principles through problem-solving experiences. Activities in descriptive geometry, materials science, and technical systems challenge students as they communicate information through seminars, technical reports, and idea sharing.

### Advanced Engineering 8491

**Grade Level:** 11 or 12 (36 weeks)

**Prerequisite:** Introduction to Engineering

To learn the applications and design process of engineering, students form engineering teams and select a group design problem. Each team uses communications, graphics, mathematics, and community resources to solve problems. Each team learns appropriate information in order to complete a project. Projects may be models, systems, or products that creatively solve an engineering problem.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Introduction to Engineering 8490</li> <li>• Advanced Engineering 8491</li> </ul>	Introduction to Engineering 8490 <b>and</b> Advanced Engineering 8491 <b>and</b> one course from the following programs: <ul style="list-style-type: none"> <li>• Design and Technology Program</li> <li>• Communication and Information Technology Program</li> <li>• Control Technology Program</li> <li>• Production Technology Program</li> <li>• Technical Design and Illustration Program</li> <li>• Biotechnology Program</li> </ul>	Available upon completion of Introduction to Engineering 8490 <b>or</b> Advanced Engineering 8491: <ul style="list-style-type: none"> <li>• Pre-Engineering/Engineering Technology Assessment (NOCTI)</li> </ul>	Science, Technology, Engineering, and Mathematics

## Engineering, Option 2

---

### Principles of Engineering 8441

**Grade Level:** 9 (36 weeks)

Students in Principles of Engineering develop an understanding of the engineering profession and the fundamental aspects of engineering problem solving. Students study the historical and current impacts of engineering on society as well as ethical implications. Mathematical and scientific concepts will be applied to fundamental engineering topics, including mechanics and electrical circuit theory.

### Introduction to Engineering Design 8439

**Grade Level:** 9-10 (36 weeks)

Using computer-modeling software, students learn the design process. They solve design problems as they develop, create, and analyze product models.

### Digital Electronics 8440

**Grade Level:** 10-11 (36 weeks)

Students use computer simulations to learn about the logic of electronics as they design, test, and actually construct circuits and devices. They apply control system programming and explore sequential logic and digital circuitry fundamentals. Topics in computer circuitry are also presented, including circuitry analysis and an exploration into diodes, transistors, and operational amplifiers.

### Computer Integrated Manufacturing 8442

**Grade Level:** 11-12 (36 weeks)

Students learn concepts of robotics and automated manufacturing by creating three-dimensional designs with modeling software and producing models of their designs. Students use CNC equipment to produce actual models of their three-dimensional designs. Fundamental concepts of robotics used in automated manufacturing and design analysis are included.

### Engineering Design and Development 8443

**Grade Level:** 12 (36 weeks)

Students enrolled in the Engineering Design and Development course synthesize knowledge, skills, and abilities through an authentic engineering experience. Students are expected to develop and formally present an independent study project and a team-oriented project, with are critiqued by an evaluation committee. Students interact and work with community mentors to research, design, and construct solutions to engineering problems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Principles of Engineering 8441</li> <li>• Introduction to Engineering Design 8439</li> <li>• Digital Electronics 8440</li> </ul>	<ul style="list-style-type: none"> <li>• Principles of Engineering 8441</li> <li>• Introduction to Engineering Design 8439</li> <li>• Digital Electronics 8440</li> </ul> <p><b>and</b> one of the following courses:</p> <ul style="list-style-type: none"> <li>• Computer Integrated Manufacturing 8442</li> <li>• Engineering Design and Development 8443</li> </ul>	Available upon completion of Principles of Engineering 8441, Introduction to Engineering Design 8439, or Digital Electronics 8440: <ul style="list-style-type: none"> <li>• Pre-Engineering/Engineering Technology Assessment (NOCTI)</li> </ul>	Science, Technology, Engineering, and Mathematics

## Communication and Information Technology

### Computer Control and Automation 8421 (formerly Computing Systems)

**Grade Level:** 9, 10, or 11 (36 weeks)

### Computer Control and Automation 8420 (formerly Computing Systems)

**Grade Level:** 9, 10, or 11 (18 weeks)

Students engage in a broad study of the technical aspects of computers and their applications to production, transportation, and communication systems. Topics include computer equipment and operating systems, programming, control processing information, and social/cultural impact of computers. Problem-solving activities challenge students to plan, program, and interface devices with computer systems. Learning activities include experiences with robotics and control systems, computer-aided design, and computer-aided manufacturing.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Computer Control and Automation 8421 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Graphic Communications Systems 8458</li> </ul>	Computer Control and Automation 8421 <b>and</b> two of the following: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Electronics Systems 8416</li> <li>• Graphic Communication Systems 8458</li> <li>• Production Systems 8447</li> <li>• Manufacturing Systems 8425</li> </ul>	Available upon completion of Computer Control and Automation 8421: <ul style="list-style-type: none"> <li>• IT Essentials Certificate Level 1 (Cisco Systems)</li> </ul>	Information Technology

### Communication Systems 8415

**Grade Level:** 9, 10, 11, or 12 (36 weeks)

### Communication Systems 8418

**Grade Level:** 9, 10, 11, or 12 (18 weeks)

This course provides experiences related to various modes of communicating information, using data, technical design, optics, graphic production, audio and video, and integrated systems. Students solve problems involving input, process, output, and feedback processes. Also, students learn about potential career choices related to communication and impact of communication on society.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Communication Systems 8415 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Graphic Communications Systems 8458</li> <li>• Computer Control and Automation 8421</li> <li>• Geospatial Technology 8423</li> <li>• Imaging Technology 8455</li> </ul>	Communication Systems 8415 <b>and</b> two of the following: <ul style="list-style-type: none"> <li>• Computer Control and Automation 8421</li> <li>• Electronics Systems 8416</li> <li>• Geospatial Technology 8423</li> <li>• Graphic Communications Systems 8458</li> <li>• Imaging Technology 8455</li> </ul>	Brainbench Desktop Publishing Software Certifications	Information Technology

**Graphic Communications Systems 8458****Grade Level:** 10, 11, or 12 (36 weeks)**Graphic Communications Systems 8494****Grade Level:** 10, 11, or 12 (18 weeks)

This course provides experiences related to a wide range of tools and materials used to reproduce information and images. Several mediums are used, including paper, metal, plastic, and fabric. Students develop competencies in message design, composition and assembly, film conversion and assembly, and message transfer and product conversion.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Graphic Communication Systems 8458 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Graphic Communications Systems 8458</li> <li>• Imaging Technology 8455</li> </ul>	Graphic Communications Systems 8458 <b>and</b> two of the following: <ul style="list-style-type: none"> <li>• Technology Foundations 8403</li> <li>• Communication Systems 8415</li> <li>• Computer Control and Automation 8421</li> <li>• Technology Foundations 8403</li> <li>• Imaging Technology 8455</li> <li>• Geospatial Technology 8423</li> </ul>	Brainbench Desktop Publishing Software Certifications	Arts, Audio-Video Technology and Communications

**Geospatial Technology 8423****Grade Level:** 9, 10, 11, 12 (36 weeks)

The Geospatial Technology program provides experiences pertaining to the study of geographic information systems (GIS), global positioning systems (GPS), remote sensing (RS), digital image processing simulator (DIPS), Geodesy, Automated Cartography (Auto-Carto), Land Surveying (LS), and navigation. Fundamentally, these technologies allow students to explore and analyze the natural and human-made world, from local to global and beyond. Students will use various tools, processes, and techniques to create, store, access, manipulate, and revise data to solve human challenges. These experiences will employ real-world spatial analysis models and guidelines for integrating, interpreting, analyzing, and synthesizing data, with a focus on both the implications and the limitations of such technologies. These experiences also include the interfacing to telecommunications and automated data base management systems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Geospatial technology 8423 <b>and</b> one of the following courses <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Imaging Technology 8455</li> </ul>	Geospatial Technology 8423 <b>and</b> two of the following courses: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Imaging Technology 8455</li> <li>• Technology Foundations 8403</li> </ul>	N/A	Information Technology

**Imaging Technology 8455****Grade Level:** 9, 10, 11, 12 (36 weeks)

Imaging Technology introduces students to the basic principles of photography while providing a strong emphasis on digital imaging. Students study the development of photography as a communication medium and its evolution into the digital realm. Students learn to use image-editing software to manipulate digital images.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Imaging Technology 8455 <b>and</b> one of the following courses: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Geospatial Technology 8423</li> <li>• Video and Media Technology 8497</li> </ul>	Imaging Technology 8455 <b>and</b> two of the following courses: <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Geospatial Technology 8423</li> <li>• Graphic Communication Systems 8458</li> <li>• Video and Media Technology 8497</li> </ul>	N/A	Arts, Audio-Video Technology and Communications

### Video and Media Technology 8497

**Grade Level:** 10, 11, 12 (36 weeks)

This course offers students an opportunity to study all aspects of video and media production, from planning and writing for production to operating studio and editing equipment. Students practice various methods of gathering news and information from individuals, research, and online resources. In addition, students are introduced to analog and digital principles of film production.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Video and Media Technology 8497</li> <li>• Communication Systems 8415</li> </ul>	<ul style="list-style-type: none"> <li>• Video and Media Technology 8497</li> <li>• Communication Systems 8415</li> <li>• Graphic Communications Systems 8458</li> </ul>	N/A	Arts, Audio-Video Technology and Communications

## Control Technology

### Electronics Systems I 8416 (36 weeks)

### Electronics Systems I 8417 (18 weeks)

**Grade Level:** 9, 10, 11, or 12

This course engages students in electricity and electronic experiments that focus on the application of scientific theories and mathematics principles. Students solve problems using simple electrical devices and circuits and build electronic projects using dc and ac devices and circuits.

### Electronics Systems II 8412

**Grade Level:** 10, 11, or 12 (36 weeks)

**Prerequisite:** Electronics Systems I

Students work with electronics devices, instruments, and circuits, building projects to apply theories and laws with electronic components such as resistors, capacitors, and transistors. They also study integrated circuits used in computers, amplifiers, television, and other equipment.

### Electronics Systems III 8413

**Grade Level:** 11 or 12 (36 weeks)

**Prerequisite:** Electronics Systems II

Electronics III teaches advanced electronic concepts, focusing on cutting-edge digital electronics, microprocessors, and automation. Students analyze emerging technologies related to the electronics industry while studying theory, using electronic test equipment, and investigating careers related to electrical engineering.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Electronics Systems I 8416</li> <li>• Electronics Systems II 8412</li> </ul>	<ul style="list-style-type: none"> <li>• Electronics Systems I 8416</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8423</li> </ul>	Available upon completion of Electronics Systems II or III: <ul style="list-style-type: none"> <li>• A+ (CompTIA)</li> <li>• A+ Operating Systems Technologies Examination (CompTIA)</li> <li>• A+ Core Hardware Examination (CompTIA)</li> <li>• Certified Electronics Technician Associate (ETA)</li> <li>• Electronic Technology Assessment (NOCTI)</li> <li>• Student Electronics Technician Certification (SET) (ETA)</li> </ul>	Science, Technology, Engineering, and Mathematics

**Power and Transportation 8445**

**Grade Level:** 9, 10, or 11 (36 weeks)

**Power and Transportation 8444**

**Grade Level:** 9, 10, or 11 (18 weeks)

Students survey the many broad sources of energy and power used in power and transportation systems. Instruction in this single-period course includes ways that (1) energy is converted to power; (2) power is transmitted and controlled; and (3) power is used through mechanical, fluid, and electrical devices. Students explore career opportunities in power and transportation fields and build projects, conduct experiments, and repair mechanical devices such as small engines, electrical motors, and outboard motors.

**Energy and Power 8448**

**Grade Level:** 10, 11, or 12 ((36 weeks)

**Energy and Power 8495**

**Grade Level:** 10, 11, or 12 (18 weeks)

In this single-period laboratory course, students learn about the application of power and energy systems to common power devices and transportation vehicles and apply theory to the practical servicing of common machines such as small gasoline engines, outboard motors, motorcycles, and lawn mowers.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Power and Transportation 8445</li> <li>• Energy and Power 8448</li> </ul>	<ul style="list-style-type: none"> <li>• Power and Transportation 8445</li> <li>• Energy and Power 8448</li> <li>• Electronics Systems I 8416</li> </ul>	N/A	Transportation, Distribution, and Logistics

## Production Technology

### Construction Technology 8431

**Grade Level:** 10, 11, or 12 (36 weeks)

### Construction Technology 8432

**Grade Level:** 10, 11, or 12 (18 weeks)

In this single-period laboratory course, students design, build, and test scale-model structures and work with projects that help them to understand the jobs of architects, carpenters, electricians, plumbers, surveyors, contractors, masons, design engineers, and a variety of other construction careers. (This course is a companion to Manufacturing Systems.)

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Construction Technology 8431 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Materials and Processes Technology 8433</li> <li>• Manufacturing Systems 8425</li> </ul>	Construction Technology 8431 <b>and</b> two of the following: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Manufacturing Systems 8425</li> <li>• Materials and Processes Technology 8433</li> </ul>	N/A	Architecture and Construction

### Materials and Processes Technology 8433

**Grade Level:** 9, 10, or 11 (36 weeks)

### Materials and Processes Technology 8478

**Grade Level:** 9, 10, or 11 (18 weeks)

Students focus on industrial/technical materials and processes as they fabricate usable products and conduct experiments. Learning experiences include career analysis as well as the use of tools and equipment related to analysis, testing, and processing of metals, plastics, woods, ceramics, and composite materials. This course is recommended for students interested in technical careers and others wishing to improve their consumer knowledge and technological literacy.

### Production Systems 8447

**Grade Level:** 9, 10, or 11 (36 weeks)

### Production Systems 8446

**Grade Level:** 9, 10, or 11 (18 weeks)

Students assess the relationship between production and society as they compose design portfolios, construct production prototypes, and apply automation to evaluate their solutions to technological problems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Materials and Processes Technology 8433 <b>and</b> one of the following courses: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Construction Technology 8431</li> <li>• Manufacturing Systems 8425</li> </ul>	Materials and Processes Technology 8433 <b>and</b> two of the following courses: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Construction Technology 8431</li> <li>• Manufacturing Systems 8425</li> <li>• Advanced Manufacturing Systems 8427</li> </ul>	N/A	Manufacturing

**Manufacturing Systems 8425****Grade Level:** 10, 11, or 12 (36 weeks)**Manufacturing Systems 8426****Grade Level:** 10, 11, or 12 (18 weeks)

This course provides an orientation to careers in various fields of manufacturing. Emphasis will be placed on the major systems in automated manufacturing, including design, electrical, mechanical, manufacturing processes, material handling, and quality control. Students participate in teams produce manufacturing projects that demonstrate critical elements of manufacturing.

**Advanced Manufacturing Systems 8427****Grade Level:** 11 or 12 (36 weeks)**Prerequisite:** Manufacturing Systems 8425 (36 weeks)

Students develop an in-depth understanding of automation and its applications in manufacturing. Activities center on flexible manufacturing processes and computer integrated manufacturing (CIM). Students work in teams to solve complex interdisciplinary problems that stem from the major systems in automated manufacturing.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Manufacturing Systems 8425</li> <li>• Advanced Manufacturing Systems 8427</li> </ul>	Manufacturing Systems 8425 <b>and</b> Advanced Manufacturing Systems 8427 <b>and</b> one course from any of the following programs: <ul style="list-style-type: none"> <li>• Design and Technology Program</li> <li>• Pre-Engineering Program</li> <li>• Communication and Information Technology Program</li> <li>• Control Technology program</li> <li>• Production Technology Program</li> <li>• Technical Design and Illustration Program</li> <li>• Biotechnology Program</li> </ul>	Available upon completion of Manufacturing Systems <b>or</b> Advanced Manufacturing Systems: <ul style="list-style-type: none"> <li>• Manufacturing Technology (NOCTI)</li> </ul>	Manufacturing

**Information Technology in Production Systems 8496****Grade Level:** 9, 10, 11, 12 (36 weeks)

Information Technology in Production Systems provides experiences pertaining to the core elements of information technology (information services and support, network systems, programming and software development, and interactive media) with an emphasis on the following technical systems: communication, construction, manufacturing, transportation, and biotechnology. Students also work in teams to gain an understanding of the ways information-based project are managed and implemented in various career fields.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Information Technology in Production Systems 8496 <b>and</b> one of the following courses: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Construction Technology 8431</li> <li>• Manufacturing Systems 8425</li> <li>• Advanced Manufacturing Systems 8427</li> </ul>	Information Technology in Production Systems 8496 <b>and</b> two of the following courses: <ul style="list-style-type: none"> <li>• Production Systems 8447</li> <li>• Construction Technology 8431</li> <li>• Manufacturing Systems 8425</li> <li>• Advanced Manufacturing Systems 8427</li> <li>• Electronics Systems I 8416</li> <li>• Power and Transportation 8445</li> </ul>	Available upon completion of Information Technology in Production Systems sequence: <ul style="list-style-type: none"> <li>• A+ Certification (CompTIA)</li> <li>• A+ Operating Systems Technologies Examination (CompTIA)</li> <li>• A+ Core Hardware Examination (CompTIA)</li> <li>• IT Essentials Certificate Level 1 (Cisco Systems)</li> </ul>	Manufacturing

## Technical Design and Illustration

### Technical Drawing/Design 8435

**Grade Level:** 9, 10, or 11 (36 weeks)

### Technical Drawing/Design 8434

**Grade Level:** 9, 10, or 11 (18 weeks)

In this foundation course, students learn the basic language of technical design, and they design, sketch, and make technical drawings, models, or prototypes of real design problems. The course is especially recommended for future engineering and architecture students.

### Engineering Drawing/Design 8436

**Grade Level:** 10, 11, or 12 (36 weeks)

### Engineering Drawing/Design 8493

**Grade Level:** 10, 11, or 12 (18 weeks)

**Prerequisite:** Technical Drawing/Design

Students use a graphic language for product design, technical illustration, assembly, patent, and aeronautical drawings. They increase their understanding of drawing techniques learned in the prerequisite course. Students use computers, calculators, and descriptive geometry and adhere to established standards to solve design problems. Throughout the course, they hold seminars, meet engineers, and tour technical design firms in order to learn about the benefits of the course on their future study and career. Completion of this course may contribute to a student's preparation for the AutoCAD 2000 certification examination.

### Architectural Drawing/Design 8437

**Grade Level:** 10, 11, or 12 (36 weeks)

### Architectural Drawing/Design 8492

**Grade Level:** 10, 11, or 12 (18 weeks)

**Prerequisite:** Technical Drawing/Design

Students learn the principles of architecture and increase understanding of working drawings and construction techniques learned in the prerequisite course. Experiences include residential and commercial building designs, rendering, model making, structural details, and community planning. Students use computer-aided drawing and design (CAD) equipment and established standards or codes to prepare models for presentation. The course provides information helpful for the homeowner and is especially beneficial to the future architect, interior designer, or homebuilder.

### Digital Visualization 8459

**Grade Level:** 10, 11, 12 (36 weeks)

**Prerequisite:** Technical Drawing/Design 8435

Students will gain experiences related to computer animation by solving problems involving 3D object manipulation, storyboarding, texture mapping, lighting concepts, and environmental geometry. They will produce animations that include interdisciplinary projects related to science, engineering, and the entertainment industry. A major emphasis will be the production of a portfolio that showcases examples of original student work.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Technical Drawing/Design 8435 <b>and</b> one of the following courses: <ul style="list-style-type: none"><li>• Architectural Drawing/Design 8437</li><li>• Engineering Drawing/Design 8436</li><li>• Digital Visualization 8459</li></ul>	Technical Drawing/Design 8435 <b>and</b> two of the following courses: <ul style="list-style-type: none"><li>• Engineering Drawing/Design 8436</li><li>• Architectural Drawing/Design 8437</li><li>• Digital Visualization 8459</li></ul>	Available upon completion of any Technical Drawing and Illustration course: <ul style="list-style-type: none"><li>• AutoCAD Certifications (includes 2000, 2002, and 2004) (Brainbench)</li></ul>	<ul style="list-style-type: none"><li>• Science, Technology, Engineering, and Mathematics</li><li>• Architecture and Construction (Architectural Drawing/Design only)</li></ul>

## Principles of Technology

### Principles of Technology I 9811

**Grade Level:** 10, 11, or 12 (36 weeks)

Students in this single-period laboratory science course apply physics and mathematics concepts through a unified systems approach to develop a broad knowledge base of the principles underlying modern technical systems. Students study seven technical principles: force, work, rate, resistance, energy, power, and force transformers, emphasizing how each principle plays a unifying role in the operation of mechanical, fluid, electrical, and thermal systems in high-technology equipment. This "principles and systems" approach to studying these technical principles provides a foundation for further education and career flexibility as technology and technical systems advance.

### Principles of Technology II 9812

**Grade Level:** 11 or 12 (36 weeks)

**Prerequisite:** Principles of Technology I (36 weeks)

Students continue to apply physics and mathematics concepts through a unified systems approach to expand their knowledge base of the principles underlying modern technical systems. This course focuses on seven technical principles: momentum, waves, energy converters, transducers, radiation, optical systems, and time constants, emphasizing how each principle plays a unifying role in the operation of mechanical, fluid, electrical, and thermal systems in high-technology equipment. This "principles and systems" approach to studying these technical principles provides a foundation for further education and career flexibility as technology and technical systems advance.

Note: Students who complete Principles of Technology I (9811) and Principles of Technology II (9812) may use these courses to satisfy one (1) physics credit in laboratory science. A student must complete both courses in the sequence in order to receive laboratory science credit. The sequence of Principles of Technology I (9811) and Principles of Technology II (9812) will satisfy one (1) unit of credit in laboratory science for physics and one (1) elective credit. Students who enroll in Principles of Technology courses for a physics credit must have completed Algebra I and two (2) other laboratory science courses as specified by the accrediting standards prior to enrolling in Principles of Technology.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Principles of Technology I 9811</li> <li>Principles of Technology II 9812</li> </ul>	N/A	N/A	Science, Technology, Engineering, and Mathematics

## Biotechnology Program

---

### Biotechnology Foundations 8468

**Grade Level:** 10, 11, or 12

This course focuses on various techniques that are used to modify living organisms, or parts of organisms, to improve plants and animals, and the development of microorganisms for specific purposes. Student activities range from bioprocessing and genetic engineering to medicine, biomechanical systems, and the environment. Students gain insight and understanding about biotechnology career fields.

### Bioengineering 8467

**Grade Level:** 11 or 12

**Prerequisite:** Biotechnology Foundations

The study of bioengineering combines engineering, medicine and other biological sciences. Students explore the process of designing and producing a variety of bio-based products. Student research and problem-based activities include a) designing artificial limbs and other organ substitutes, and b) producing and testing electronic instruments and advanced equipment used in biotechnology.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Biotechnology Foundations 8468</li> <li>Bioengineering 8467</li> </ul>	<ul style="list-style-type: none"> <li>Biotechnology Foundations 8468</li> <li>Bioengineering</li> <li>Electronics Systems 8416</li> </ul>	N/A	Science, Technology, Engineering, and Mathematics

## Other Courses

---

For information on the following courses, please contact the Technology Education Service, Virginia Department of Education:

- Technology Awareness (Grades K-5) 8410 (36 weeks)
- Dual Enrollment with Postsecondary 8498 (36 weeks)
- Technology Studies 8465 (36 weeks)
- Advanced Technology Studies 8466 (36 weeks)
- Career and Technical Education Occupational Exploration—Disadvantaged 8469 (36 weeks)
- Career and Technical Education Occupational Exploration—Disabled 8471 (36 weeks)
- Industrial Occupational Exploration 8472 (36 weeks); 8473 (18 weeks)



## **Section 7: Trade and Industrial Education 2006-2007**

### **Need course information?**

- Course Descriptions
- Course Sequences
- Certifications, Licenses, and Assessments
- Career Clusters





## Section 7: Trade and Industrial Education

### Course Descriptions, Sequences, Certifications, Career Clusters

#### Section Overview

---

This section presents course information applicable to the Trade and Industrial Education program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

***For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure.*** In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

## Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

## Communications and Graphics

---

### Advertising Design I 8570

Grade Level: 10 or 11

### Advertising Design II 8571

Grade Level: 11 or 12

**Prerequisite:** Advertising Design I

### Advertising Design III 8572

Grade Level: 12

**Prerequisite:** Advertising Design II

Students will learn the skills and principles involved in the development and function of advertising and the production process. Students will apply aesthetic theories and technical skills to graphic design objectives. Elements covered are design, illustration, typography, photography, computer graphics, advertising techniques, and preparation of camera-ready copy for print material.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"><li>Advertising Design I 8570</li><li>Advertising Design II 8571</li><li>Advertising Design III 8572 or ICT 8904 if needed for local scheduling option</li></ul>	Available upon completion of Advertising Design sequence: <ul style="list-style-type: none"><li>Advertising Design Assessment (NOCTI)</li></ul>	Arts, Audio-Video Technology, and Communications

### Basic Photography 8610

**Grade Level:** 10 or 11 (one year)

Students enrolled in this program will learn photographic skills such as using multiple camera formats to set up, shoot, process and present photographic images; creating images using digital technology and preparing a professional portfolio to prepare for a career in the field of photography.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Photography 8610 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Communications Systems 8415</li> <li>• Graphic Communications Systems 8458</li> </ul>	<ul style="list-style-type: none"> <li>• Basic Photography 8610</li> <li>• Communications Systems 8415 <b>or</b> Graphic Communications Systems 8458 <b>and</b> one of the following:</li> <li>• Entrepreneurship Education 9094</li> <li>• Industrial Cooperative Training 8904</li> </ul>	N/A	Arts, Audio-Video Technology, and Communications

**Commercial Photography I 8607**

Grade Level: 10 or 11

**Commercial Photography II 8608**

Grade Level: 11 or 12

**Prerequisite:** Commercial Photography I

**Commercial Photography III 8609**

Grade Level: 12

**Prerequisite:** Commercial Photography II

Students learn to operate air brushes, cameras, meters, and other photographic equipment. Instructional topics include composition and color dynamics, contact printing, enlarging and developing film, and processing microfilm.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Commercial Photography I 8607</li> <li>• Commercial Photography II 8608</li> <li>• Commercial Photography III 8609 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Arts, Audio-Video Technology, and Communications

**Computer Networking Hardware Operations I 8542**

Grade Level: 11 (18 weeks)

**Computer Networking Hardware Operations II 8543**

Grade Level: 11 (18 weeks)

**Prerequisite:** Computer Networking Hardware Operations I

**Computer Networking Hardware Operations III 8544**

Grade Level: 12 (18 weeks)

**Prerequisite:** Computer Networking Hardware Operations II

**Computer Networking Hardware Operations IV 8545**

Grade Level: 12 (18 weeks)

**Prerequisite:** Computer Networking Hardware Operations III

Students learn networking principles and the building and maintenance of computer networks in a Web-based, hands-on curriculum.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Computer Networking Hardware Operations I 8542</li> <li>Computer Networking Hardware Operations II 8543</li> <li>Computer Networking Hardware Operations III 8544</li> <li>Computer Networking Hardware Operations IV 8545</li> </ul> <ul style="list-style-type: none"> <li>Information Technology Fundamentals 6670 or Information Technology in Production Systems 8496 may precede Computer Networking Hardware Operations I 8542.</li> </ul>	N/A	<p><b>Cisco CCNA Academy Program</b> Available upon completion of CNSO I and II:</p> <ul style="list-style-type: none"> <li>Introduction to Cisco Networking Technologies Examination</li> </ul> <p>Available upon completion of CNSO I*:</p> <ul style="list-style-type: none"> <li>Cisco CCNA 1, Networking Basics Examination</li> </ul> <p>Available upon completion of CNSO II*:</p> <ul style="list-style-type: none"> <li>Cisco CCNA 2, Routers Examination</li> </ul> <p>Available upon completion of CNSO III*:</p> <ul style="list-style-type: none"> <li>Cisco CCNA 3, Switching Examination</li> </ul> <p>Available upon completion of CNSO IV*:</p> <ul style="list-style-type: none"> <li>Cisco CCNA 4, WAN Technologies Examination</li> </ul> <p>*Pass any two of the four examinations. Available upon completion of CNSO I, II, III, IV:</p> <ul style="list-style-type: none"> <li>Interconnecting Cisco Networking Devices Examination</li> </ul>	Information Technology

**Computer Repair and Servicing (Computer Maintenance) 8621**

Grade Level: 10 or 11 (1 year)

Students enrolled in this course learn fundamental skills associated with maintenance of computers.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>Computer Repair and Servicing 8621 <b>and</b> one of the following:</p> <ul style="list-style-type: none"> <li>Electronics Systems I 8416</li> <li>Computer Control and Automation 8421</li> </ul>	<ul style="list-style-type: none"> <li>Computer Repair and Servicing 8621</li> <li>Electronics Systems I 8416 <b>or</b> Computer Control and Automation 8421 <b>and</b> one of the following:</li> <li>Entrepreneurship Education 9094</li> <li>Industrial Cooperative Training 8904</li> </ul>	N/A	Information Technology

**Computer Systems Technology I 8622**

Grade Level: 10 or 11

**Computer Systems Technology II 8623**

Grade Level: 11 or 12

**Prerequisite:** Computer Systems Technology I

**Computer Systems Technology III 8624**

Grade Level: 12

**Prerequisite:** Computer Systems Technology II

Students learn to construct, troubleshoot, service, and repair computer systems, related components, and software, and install and maintain local area networks.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations	Information Technology Fundamentals 6670 or 8496 may precede Computer Systems Technology I 8622 <ul style="list-style-type: none"> <li>• Computer Systems Technology I 8622</li> <li>• Computer Systems Technology I 8623</li> <li>• Computer Systems Technology III 8624 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Computer Systems Technology sequence: <ul style="list-style-type: none"> <li>• A+ (CompTIA)</li> <li>• A+ Certification Operating Systems Technologies Examination (CompTIA)</li> <li>• A+ Certification Core Hardware Examination (CompTIA)</li> <li>• Brainbench Systems Administration Certification</li> <li>• Brainbench Technical Support Certification</li> <li>• Certified Computer Service Technician (ETA)</li> <li>• Fundamentals of Wireless LANs Certificate (Cisco Systems)</li> <li>• IT Essentials 1 Certificate (Cisco Systems)</li> </ul>	Information Technology
+Specific approved Brainbench Network Administration Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=22&amp;cat3=24">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=22&amp;cat3=24</a> +Specific approved Brainbench Technical Support Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=28">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=28</a>			

### Drafting I 8530

Grade Level: 10 or 11

### Drafting II 8531

Grade Level: 11 or 12

Prerequisite: Drafting I

### Drafting III 8532

Grade Level: 12

**Prerequisite:** Drafting II

Students learn theory and the manipulative skills necessary to produce complete and accurate drawings based on the ideas and sketches of engineers, architects, and designers. They design and prepare mechanical, structural, and architectural plans, electronics, transmitters, power supplies, and receivers relevant to consumer electronic products as they practice electronic product troubleshooting, servicing, and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Drafting I 8530</li> <li>• Drafting II 8531</li> <li>• Drafting III 8532 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Drafting sequence: <ul style="list-style-type: none"> <li>• Architectural Drafting Assessment (NOCTI)</li> <li>• AutoCAD Certifications (Brainbench)</li> <li>• CAD Assessment ((NOCTI)</li> <li>• Drafter Certification (American Design Drafting Association)</li> <li>• General Drafting and Design (NOCTI)</li> </ul>	Architecture and Construction

**Electronics Technology I 8536**

Grade Level: 10 or 11

**Electronics Technology II 8537**

Grade Level: 11 or 12

**Prerequisite:** Electronics Technology I**Electronics Technology III 8538**

Grade Level: 12

**Prerequisite:** Electronics Technology II

Students learn to assemble, install, operate, maintain, repair, and troubleshoot electrical/electronic equipment used in industry and manufacturing. Digital and computer circuitry, synchro- and servomechanisms, mechanical power transfer systems, three-phase alternate current and electronic wave shaping are included in this program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Electronics Technology I 8536</li> <li>• Electronics Technology II 8537</li> <li>• Electronics Technology III 8538 or ICT 8904 (if needed for local scheduling option)</li> </ul>	Available upon completion of Electronics Technology sequence: <ul style="list-style-type: none"> <li>• Certified Computer Service Technician (ETA)</li> <li>• Certified Electronics Technician (CET) Associate (ETA)</li> <li>• Certified Satellite Dish Installer (ETA)</li> <li>• Electronic Technology Assessment (NOCTI)</li> <li>• Student Electronics Technician Certification (SET) (ETA)</li> <li>• Telecommunications Electronics Technician (ETA)</li> </ul>	Science, Technology, Engineering, and Mathematics

**Graphic Imaging Technology I 8660**

Grade Level: 10 or 11

**Graphic Imaging Technology II 8661**

Grade Level: 11 or 12

**Prerequisite:** Graphic Imaging Technology I**Graphic Imaging Technology III 8662**

Grade Level: 12

**Prerequisite:** Graphic Imaging Technology II

Graphic Imaging Technology prepares students for a career in what has traditionally been called the printing industry. Students learn to design and produce print media, which includes layout, electronic imaging, offset printing, bindery and finishing, and other graphic arts related to the printing industry. Graphic Imaging Technology programs may be certified by PrintED, the certification agency for Printing Industries of America. See Graphic Imaging Technology Framework for additional information.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Graphic Imaging Technology I 8660</li> <li>Graphic Imaging Technology II 8661</li> <li>Graphic Imaging Technology III 8662 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Graphic Imaging Technology sequence: <ul style="list-style-type: none"> <li>Adobe Certified Expert (ACE) (Adobe Systems Incorporated)</li> <li>Brainbench Desktop Publishing Software Certifications+</li> <li>Graphic Communication Technology Assessment (NOCTI)</li> <li>PrintED Certification (all exams) (Graphic Arts Education and Research Foundation)</li> </ul>	Arts, Audio-Video Technology, and Communications
+Specific approved Brainbench Desktop Publishing Software Certifications can be found at <a href="http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=10">http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&amp;cat2=10</a>			

**Radio Communications I 8640**

Grade Level: 10 or 11

**Radio Communications II 8641**

Grade Level: 11 or 12

**Prerequisite:** Radio Communications I

**Radio Communications III 8642**

Grade Level: 12

**Prerequisite:** Radio Communications II

Students learn basic electricity and electronics, including all aspects of safety as well as related mathematics. Activities provide the skills for obtaining a radio-telephone operator license. Students learn practices related to the management and operation of a broadcasting station.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Radio Communications I 8640</li> <li>Radio Communications II 8641</li> <li>Radio Communications III 8642 or ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Arts, Audio-Video Technology, and Communications

**Robotic Workcell Technology I 8557**

Grade Level: 10 or 11

**Robotic Workcell Technology II 8558**

Grade Level: 11 or 12

**Prerequisite:** Robotic Workcell Technology I

**Robotic Workcell Technology III 8559**

Grade Level: 12

**Prerequisite:** Robotic Workcell Technology II

This course provides instruction in basic computer programming, electronics, motor control, and feedback systems used in assembly and manufacturing settings. In addition, students learn how to program a microcontroller for robotic manipulation.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Robotic Workcell Technology I 8557</li> <li>• Robotic Workcell Technology II 8558</li> <li>• Robotic Workcell Technology III 8559 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Science, Technology, Engineering, and Mathematics

**Telecommunications I 8650**

Grade Level: 10 or 11

**Telecommunications II 8651**

Grade Level: 11 or 12

**Prerequisite:** Telecommunications I

Students will learn about the technological and competitive advances now transforming the communications industry. This course will introduce students to the basic concepts and structural elements of voice, video, and data communications industry. Topics will include an introduction to signal transmission, attenuation, distortion, and signal propagation over cables, fiber, and air. User-premises based telecommunications platforms, switching, wiring, and networking, as well as facilities that provide and support telecommunications systems will be studied. Students will have the skills to become Certified Telecommunications Technicians, Satellite Technicians, and Certified Fiber Optics Technicians through Electronics Technicians Association International (ETA).

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Telecommunications I 8650</li> <li>• Telecommunications II 8651</li> </ul>	N/A	Telecommunications Electronics Technician Certification (ETA)	Arts, Audio-Video Technology, and Communications

**Television Production I 8688**

Grade Level: 10 or 11

**Television Production II 8689**

Grade Level: 11 or 12

**Prerequisite:** Television Production I

**Television Production III 8690**

Grade Level: 12

**Prerequisite:** Television Production II

Students learn to operate equipment such as TV cameras, video tape recorders, microphones, audio mixers, and audio/video editing systems. They practice skills related to production, direction, and scripting of programs and set design and construction. Students also study control room procedures and responsibilities.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Television Production I 8688</li> <li>• Television Production II 8689</li> <li>• Television Production III 8690 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Television Production sequence: <ul style="list-style-type: none"> <li>• Audio-Visual Communications Assessment (NOCTI)</li> <li>• Television Broadcasting Assessment (NOCTI)</li> <li>• Visual Communications Assessment (NOCTI)</li> </ul>	Arts, Audio-Video Technology, and Communications

## Construction

### Basic Carpentry 8600

**Grade Level:** 10 or 11 (one year)

Students enrolled in this program learn fundamental skills associated with layout, framing, and construction materials and install wooden products.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Carpentry 8600 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Technical Drawing/Design 8435</li> <li>• Construction Technology 8431</li> <li>• Materials and Processes 8433</li> </ul>	Basic Carpentry 8600 <b>and</b> Technical Drawing/Design 8435 <b>or</b> Construction Technology 8431 <b>or</b> Materials and Processes 8433 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Entrepreneurship Education 9094</li> <li>• Industrial Cooperative Training 8904</li> </ul>	N/A	Architecture and Construction

### Bricklayer 8549

**Grade Level:** 10 or 11 (1 year)

Students enrolled in this program learn the fundamental skills associated with laying block and brick.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Bricklayer 8549 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Technical Drawing/Design 8435</li> <li>• Materials and Processes 8433</li> <li>• Construction Technology 8431</li> </ul>	Bricklayer 8549 <b>and</b> Technical Drawing/Design 8435 <b>or</b> Construction Technology 8431 <b>or</b> Materials and Processes 8433 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Entrepreneurship Education 9094</li> <li>• Industrial Cooperative Training 8904</li> </ul>	N/A	Architecture and Construction

### Building Trades I 8515

Grade Level: 10 or 11

### Building Trades II 8516

Grade Level: 11 or 12

**Prerequisite:** Building Trades I

### Building Trades III 8517

Grade Level: 12

**Prerequisite:** Building Trades II

This group of instructional programs prepares students to erect, install, maintain, and repair buildings, and other structures using materials such as metal, wood, stone, brick, glass, concrete and composition substances. Students develop skills in estimating costs; cutting, fastening, and fitting various materials; using hand and power tools; and following technical specifications and blueprints.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Building Trades I 8515</li> <li>• Building Trades II 8516</li> <li>• Building Trades III 8517 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Building Trades sequence: <ul style="list-style-type: none"> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Core: Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Carpentry, National Construction Career Test (NCCER)</li> <li>• Carpentry Level One, National Construction Career Test (NCCER)</li> <li>• Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute)</li> <li>• Electrical, National Construction Career Test (NCCER)</li> <li>• Electrical Principles: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• House Wiring: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Masonry, National Construction Career Test (NCCER)</li> <li>• Plumbing Assessment (NOCTI)</li> </ul>	Architecture and Construction

**Cabinetmaking I 8604**

Grade Level: 10 or 11

**Cabinetmaking II 8605**

Grade Level: 11 or 12

**Prerequisite:** Cabinetmaking I

**Cabinetmaking III 8606**

Grade Level: 12

**Prerequisite:** Cabinetmaking II

Students learn workshop and tool safety and employability skills as they practice reading blueprints, estimating and selecting materials, layout, cutting, shaping, assembling, fastening, applying wood veneers and plastic laminates, finishing surfaces, transporting and installing cabinets, cabinet components, and interior finishes. The technical, problem-solving, leadership, and creative skills learned in Cabinetmaking can be applied in industries well beyond the construction trades and professions and prepare the student for lifelong learning and success.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Cabinetmaking I 8604</li> <li>• Cabinetmaking II 8605</li> <li>• Cabinetmaking III 8606 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Cabinetmaking sequence: <ul style="list-style-type: none"> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Core: Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Cabinetmaking Assessment (NOCTI)</li> <li>• Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute)</li> </ul>	Architecture and Construction

**Carpentry I 8601**

Grade Level: 10 or 11

**Carpentry II 8602**

Grade Level: 11 or 12

Prerequisite: Carpentry I

**Carpentry III 8603**

Grade Level: 12

**Prerequisite:** Carpentry II

In this program students lay out, fabricate, erect, install, and repair wooden structures and fixtures, using hand and power tools. Instruction in common systems of framing, construction materials, estimating, and blueprint reading is included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Carpentry I 8601</li> <li>• Carpentry II 8602</li> <li>• Carpentry III 8603 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Carpentry sequence: <ul style="list-style-type: none"> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Core: Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Carpentry Assessment (NOCTI)</li> <li>• Carpentry, National Construction Career Test (NCCER)</li> <li>• Carpentry Level One, National Construction Career Test (NCCER)</li> <li>• Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute)</li> </ul>	Architecture and Construction

**Building Management I 8590**

Grade Level: 10 or 11

**Building Management II 8591**

Grade Level: 11 or 12

**Prerequisite:** Building Management I**Building Management III 8592**

Grade Level: 12

**Prerequisite:** Building Management II

Students obtain the knowledge and skills to perform the upkeep of commercial and public buildings and grounds through hands-on training in cleaning operations, building repairs, plumbing, and grounds maintenance.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Building Management I 8590</li> <li>• Building Management II 8591</li> <li>• Building Management III 8592 or ICT8904 if needed for local scheduling option</li> </ul>	N/A	Hospitality and Tourism

**Electricity I 8533**

Grade Level: 10 or 11

**Electricity II 8534**

Grade Level: 11 or 12

**Prerequisite:** Electricity I**Electricity III 8535**

Grade Level: 12

**Prerequisite:** Electricity II

Students develop skills in the installation, operation, maintenance, and repair of residential, commercial, and industrial electrical systems. They also study DC and AC motors, controls, and electrical-distribution panels.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>All T&amp;I courses available for the 3-year scheduling option are listed as specializations.</p>	<ul style="list-style-type: none"> <li>• Electricity I 8533 <b>and</b></li> <li>• Electricity II 8534 <b>and</b></li> <li>• Electricity III 8535 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	<p>Available upon completion of Electricity sequence:</p> <ul style="list-style-type: none"> <li>• Core: Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• BICSI Registered Installer, Level 1 (BICSI/International Telecommunications Association)</li> <li>• Certified Fiber Optics Installer (Association of Communications and Electronics Schools, International)</li> <li>• Certified Satellite Disk Installer (ETA)</li> <li>• Construction Electricity Assessment (NOCTI)</li> <li>• Copper-Based Cabling Certification (RBT Systems)</li> <li>• Data Cabling Installer Certification (ETA)</li> <li>• Electrical Construction Assessment (NOCTI)</li> <li>• Electricity, National Construction Career Test (NCCER)</li> <li>• Electrical Principles: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Fiber Optics Installer (ETA)</li> <li>• Fiber Optic Network Cabling Certification (RBT Systems)</li> <li>• Graymark Cable Installation Certification (Graymark International)</li> <li>• House Wiring: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Voice and Data Cabling Certification (Cisco Systems)</li> </ul>	<p>Architecture and Construction</p>

### Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) I 8503

Grade Level: 10 or 11

### HVACR II 8504

Grade Level: 11 or 12

Prerequisite: HVACR I

### HVACR III 8505

Grade Level: 12

Prerequisite: HVACR II

This instructional program prepares students to install, repair, and maintain the operating conditions of heating, air conditioning, and refrigeration systems.

Completion of this sequence may prepare students for certification exams for a variety of air conditioning/air distribution system technicians.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<p>All T&amp;I courses available for the 3-year scheduling option are listed as specializations.</p>	<ul style="list-style-type: none"> <li>• Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) I 8503</li> <li>• HVACR II 8504</li> <li>• HVACR III or ICT 8904 if needed for local scheduling option</li> </ul>	<p>Available upon completion of HVACR sequence:</p> <ul style="list-style-type: none"> <li>• Air Conditioning Certification (HVAC Excellence)</li> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Commercial Air Conditioning Certification (HVAC Excellence)</li> <li>• Commercial Refrigeration (HVAC Excellence)</li> <li>• Core, Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Electrical Certification (HVAC Excellence)</li> <li>• Electric Heat Certification (HVAC Excellence)</li> <li>• EPA Technician Certification (Core, Levels I, II, or III) (Environmental Protection Agency)</li> <li>• Gas Heat Certification (HVAC Excellence)</li> <li>• Heating, Electrical, Air Conditioning Technology (HEAT) Examination (HVAC Excellence)</li> <li>• Heat Pump Certification (HVAC Excellence)</li> <li>• HVAC, National Construction Career Test (NCCER)</li> <li>• HVAC: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Installer/Service Core Certification (NATE)</li> <li>• Light Commercial Heating &amp; Air Conditioning (ARI)</li> <li>• Oil Heat Certification (HVAC Excellence)</li> <li>• Residential Air-Conditioning and Heating Certification (ARI)</li> </ul>	<p>Science, Technology, Engineering, and Mathematics</p>

**Masonry I 8512**

Grade Level: 10 or 11

**Masonry II 8513**

Grade Level: 11 or 12

Prerequisite: Masonry I

**Masonry III 8514**

Grade Level: 12

Prerequisite: Masonry II

Students learn to use hand tools such as trowels, levels, and chisels and power tools such as concrete mixers to lay brick, concrete block, tile, and related materials.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Masonry I 8512</li> <li>• Masonry II 8513</li> <li>• Masonry III 8514 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Masonry sequence: <ul style="list-style-type: none"> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Core, Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Construction Masonry—Blocklaying Assessment (NOCTI)</li> <li>• Construction Masonry—Bricklaying Assessment (NOCTI)</li> <li>• Masonry, National Construction Career Test (NCCER)</li> </ul>	Architecture and Construction

**Plumbing I 8551**

Grade Level: 10 or 11

**Plumbing II 8552**

Grade Level: 11 or 12

Prerequisite: Plumbing I

**Plumbing III 8553**

Grade Level: 12

Prerequisite: Plumbing II

Students learn to assemble, install, and repair pipes, fittings, and fixtures of heating, water, and drainage systems, according to specification and plumbing codes.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Plumbing I 8551</li> <li>• Plumbing II 8552</li> <li>• Plumbing III 8553 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Plumbing sequence: <ul style="list-style-type: none"> <li>• Core, Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>• Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> <li>• Plumbing Assessment (NOCTI)</li> <li>• Plumbing: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute)</li> </ul>	Architecture and Construction

**Utility/Heavy Construction Technology I 8616**

Grade Level: 10 or 11

**Utility/Heavy Construction Technology II 8617**

Grade Level: 11 or 12

**Prerequisite:** Utility/Heavy Construction Technology I

**Utility/Heavy Construction Technology III 8618**

Grade Level: 12

**Prerequisite:** Utility/Heavy Construction Technology II

This program provides both the knowledge and the hands-on skills needed to secure a job as a construction equipment operator. Students learn about site grading and development, excavation, concrete structures, pipe laying, road building, and other topics. They have the opportunity to gain experience in operating excavators, bulldozers, loaders, and motor graders. Completion of this sequence may prepare students for the certification exam for medium/heavy truck technician or parts specialist.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Utility/Heavy Construction Technology I 8616</li> <li>• Utility/Heavy Construction Technology II 8617</li> <li>• Utility/Heavy Construction Technology III 8618 or ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Architecture and Construction

## Metals

---

### Industrial Maintenance Technology (IMT) I 8575

Grade Level: 10 or 11

### IMT II 8576

Grade Level: 11 or 12

Prerequisite: IMT I

### IMT III 8577

Grade Level: 12

Prerequisite: IMT II

This program focuses on the adjustment, maintenance, part replacement, and repair of tools, equipment, and machines used in industry, including hydraulic and pneumatic systems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Industrial Maintenance Technology I 8575</li> <li>Industrial Maintenance Technology II 8576</li> <li>Industrial Maintenance Technology III 8577 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Industrial Maintenance Technology sequence: <ul style="list-style-type: none"> <li>EPA Technician Certification (Core, Levels I, II, or III) (Environmental Protection Agency)</li> <li>Industrial Maintenance Mechanic Assessment (NOCTI)</li> </ul>	Manufacturing

### Precision Machining Technology (PMT) I 8539

Grade Level: 10 or 11

### PMT II 8540

Grade Level: 11 or 12

Prerequisite: PMT I

### PMT III 8541

Grade Level: 12

Prerequisite: PMT II

Students learn the basics of industrial safety and environmental protection; planning, management, and performance of machining jobs; quality control; process improvement; general maintenance; engineering drawings and sketches; and application of measurements, metalworking theory, properties of materials, and principles of CNC. Precision Machining Technology programs may be certified by NTMA (National Tooling and Machining Association), the certifying agency for the National Institute for Metalworking Skills (NIMS). See Precision Machining Technology Framework for additional information.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Precision Machining Technology I 8539</li> <li>Precision Machining Technology II 8540</li> <li>Precision Machining Technology III 8541 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Precision Machining Technology sequence: <ul style="list-style-type: none"> <li>Machining Skills Level 1—Drill Press (NIMS)</li> <li>Machining Skills Level 1—Milling Machine (NIMS)</li> <li>Machining Skills Level 1—Measurements, Materials, and Safety (NIMS)</li> <li>Precision Machining (NOCTI)</li> </ul>	Manufacturing

**Sheet Metal I 8663**

Grade Level: 10 or 11

**Sheet Metal II 8664**

Grade Level: 11 or 12

**Prerequisite:** Sheet Metal I

**Sheet Metal III 8665**

Grade Level: 12

**Prerequisite:** Sheet Metal II

Students work with materials that are cast, formed, shaped, molded, heat treated, cut, twisted, pressed, fused, or stamped. Instruction includes the planning, manufacturing, assembling, testing, and repairing of mechanisms, machines, and structures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Sheet Metal I 8663</li> <li>Sheet Metal II 8664</li> <li>Sheet Metal III 8665 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Sheet Metal sequence: <ul style="list-style-type: none"> <li>Metalworking and Fabrication (NOCTI)</li> </ul>	Manufacturing

**Welding I 8672**

Grade Level: 10 or 11

**Welding II 8673**

Grade Level: 11 or 12

**Prerequisite:** Welding I

**Welding III 8674**

Grade Level: 12

**Prerequisite:** Welding II

Students learn to use gases and/or welding processes and to braze and solder metal parts according to diagrams, blueprints, or written specifications.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Welding I 8672 <b>and</b></li> <li>Welding II 8673 <b>and</b></li> <li>Welding III 8674 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Welding sequence: <ul style="list-style-type: none"> <li>Core, Introductory Craft Skills, National Construction Career Test (NCCER)</li> <li>SENSE (American Welding Society)</li> <li>Welding (NOCTI)</li> <li>Welding, National Construction Career Test (NCCER)</li> </ul>	Manufacturing

## Personal Services

### Barbering I 8740

Grade Level: 10 or 11

### Barbering II 8741

Grade Level: 11 or 12

Prerequisite: Barbering I

### Barbering III 8742

Grade Level: 12

**Prerequisite:** Barbering II

Barbering is the study of hair, scalp, and skin. Students study and prepare in a clinical lab setting, using mannequins and live models for manipulative practice. The program emphasizes safety and sanitation, communication, and management skills. Related areas of study include psychology, ethics, and professional image. Competency completions prepare the students for the Virginia state licensing exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Barbering I 8740</li> <li>Barbering II 8741</li> <li>Barbering III 8742 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of the Barbering sequence: <ul style="list-style-type: none"> <li>Barbers license (Virginia Board of Barbers and Cosmetology, Department of Professional &amp; Occupational Regulations)</li> </ul>	Human Services

### Beauty Salon Assistant 8546

**Grade Level:** 10 or 11 (1 year)

The Beauty Salon Assistant course prepares students for work as an assistant in a hair salon. Students study and prepare in a clinical lab setting, learning practical and manipulative skills. The program emphasizes safety and sanitation, shampooing and conditioning, retailing, inventory control, and receptionist work. Competency completions allow students a certificate for job entry level employment.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Beauty Salon Assistant 8546 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>Nail Technician I 8692</li> <li>Entrepreneurship Education 9094</li> </ul>	<ul style="list-style-type: none"> <li>Beauty Salon Assistant 8546</li> <li>Industrial Cooperative Training 8904</li> </ul>	N/A	Human Services

**Commercial Sewing I 8524**

Grade Level: 10 or 11

**Commercial Sewing II 8525**

Grade Level: 11 or 12

**Prerequisite:** Commercial Sewing I**Commercial Sewing III 8526**

Grade Level: 12

**Prerequisite:** Commercial Sewing II

Students become proficient in the operation of various types of sewing machines. Instruction includes design, construction, alteration, and fitting of wearing apparel.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Commercial Sewing I 8524</li> <li>Commercial Sewing II 8525</li> <li>Commercial Sewing III 8526 or ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Manufacturing

**Cosmetology I 8527**

Grade Level: 10 or 11

**Cosmetology II 8528**

Grade Level: 11 or 12

**Prerequisite:** Cosmetology I**Cosmetology III 8529**

Grade Level: 12

**Prerequisite:** Cosmetology II

Cosmetology is the study of hair, skin, and nails and their related care. Students study and prepare in a clinical lab setting, using mannequins and live models for manipulative skill practice. The program emphasizes safety and sanitation, communication, and management skills. Related areas of study include psychology, ethics, and presentation of a professional image. Competency completions prepare the student for the Virginia state licensing exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Cosmetology I 8527</li> <li>Cosmetology II 8528</li> <li>Cosmetology III 8529 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Cosmetology sequence: <ul style="list-style-type: none"> <li>Cosmetology (Virginia Board of Barbers and Cosmetology, Department of Professions &amp; Occupational Regulations)</li> <li>Cosmetology (NOCTI)</li> </ul>	Human Services

**Nail Technician I 8692**

Grade Level: 10 or 11

**Nail Technician II 8693**

Grade Level: 11 or 12

**Prerequisite:** Nail Technician I

Students learn to manicure, pedicure, install and maintain artificial nails, and apply concepts associated with bacteriology, sanitation, nail disorders, anatomy and physiology, and safety. The course requires a minimum of 540 hours. Completion prepares students for the Virginia state licensing examination in Nail Technician.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Nail Technician I 8692 and</li> <li>Nail Technician II 8693</li> </ul>	N/A	Available upon completion of Nail Technician sequence: <ul style="list-style-type: none"> <li>Nail Technician (Virginia Board of Barbers and Cosmetology, Department of Professional &amp; Occupational Regulations)</li> </ul>	Human Services

**Protective Services****Criminal Justice I 8702**

Grade Level: 10 or 11

**Criminal Justice II 8703**

Grade Level: 11 or 12

**Prerequisite:** Criminal Justice I**Criminal Justice III 8704**

Grade Level: 12

**Prerequisite:** Criminal Justice II

Students learn the principles, techniques, and practices for pursuing careers within the criminal justice services system.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Criminal Justice I 8702</li> <li>Criminal Justice II 8703</li> <li>Criminal Justice III 8704 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Criminal Justice sequence: <ul style="list-style-type: none"> <li>Criminal Justice (NOCTI)</li> </ul>	Law, Public Safety, Corrections, and Security

**Firefighting I 8705**

Grade Level: 10 or 11

**Firefighting II 8706**

Grade Level: 11 or 12

**Prerequisite:** Firefighting I**Firefighting III 8707**

Grade Level: 12

**Prerequisite:** Firefighting II

Students learn to fight fires and control the outbreak of fire. Instruction includes fire department organization; use of various kinds of equipment such as extinguishers, pumps, hoses, ropes, ladders, gas masks, hydrants, and standpipe and sprinkler systems; methods of entry and rescue; salvage practices and equipment; and fire and arson inspection and investigation techniques.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Firefighting I 8705</li> <li>• Firefighting II 8706</li> <li>• Firefighting III 8707 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Firefighting sequence: <ul style="list-style-type: none"> <li>• Firefighter Level I Certification (Virginia Department of Fire Programs)</li> </ul>	Law, Public Safety, Corrections, and Security

**Public Safety I 8700**

Grade Level: 11 or 12

**Public Safety II 8701**

Grade Level: 12

**Prerequisite:** Public Safety I

Students learn basic procedures related to law enforcement and fire fighting occupations, including emergency medical services, traffic control, safety, crowd control, and fire prevention technology. The course requires a minimum of 540 hours.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• Public Safety I 8700</li> <li>• Public Safety II 8701</li> </ul>	N/A	N/A	Law, Public Safety, Corrections, and Security

## Transportation

### Aircraft Pilot Training I 8731

Grade Level: 10 or 11

### Aircraft Pilot Training II 8732

Grade Level: 11 or 12

**Prerequisite:** Aircraft Pilot Training I

### Aircraft Pilot Training III 8733

Grade Level: 12

**Prerequisite:** Aircraft Pilot Training II

Students participate in flight training, ground school, and simulator instruction to support the flight syllabus while studying meteorology, aerodynamics, navigation, physiology, airfield and flight environments, aircraft maneuvers, and aircraft weight and balance.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations	<ul style="list-style-type: none"> <li>Aircraft Pilot Training I 8731</li> <li>Aircraft Pilot Training II 8732</li> <li>Aircraft Pilot Training III 8733 or ICT8904 if needed for local scheduling option</li> </ul>	N/A	Transportation, Distribution, and Logistics

### Aviation Maintenance Technology I 8728

Grade Level: 11

### Aviation Maintenance Technology II 8729

Grade Level: 12

**Prerequisite:** Aviation Maintenance Technology I

Students study aircraft systems and components, technical diagrams and charts, aerodynamics, basic electricity, and electronics as specified by FAA requirements.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>Aviation Maintenance Technology I 8728 and</li> <li>Aviation Maintenance Technology II 8729</li> </ul>	N/A	N/A	Transportation, Distribution, and Logistics

### Automotive Body Technology I—Certified 8676

Grade Level: 10 or 11

### Automotive Body Technology II—Certified 8677

Grade Level: 11 or 12

**Prerequisite:** Auto Body Technology I—Certified

### Automotive Body Technology III—Certified 8678

Grade Level: 12

**Prerequisite:** Auto Body Technology II—Certified

Students learn to repair, mask, and refinish vehicles or body components. In addition, they learn the application of primers, sealers, and other prep coats and to practice maintenance and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Automotive Body Technology I—Certified 8676</li> <li>Automotive Body Technology II—Certified 8677</li> <li>Automotive Body Technology III—Certified 8678 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Automotive Body Technology sequence: <ul style="list-style-type: none"> <li>Collision Repair (NOCTI)</li> <li>Collision Repair/Refinishing Technology (NOCTI)</li> <li>Collision Repair &amp; Refinish Test Series (any exam) (NATEF)</li> <li>Refinishing Technology Assessment (NOCTI)</li> </ul>	Transportation, Distribution, and Logistics

**Automotive Body Repair I—Non-Certified 8679**

Grade Level: 10 or 11

**Automotive Body Repair II—Non-Certified 8680**

Grade Level: 11 or 12

**Prerequisite:** Auto Body Repair I

**Automotive Body Repair III—Non-Certified 8681**

Grade Level: 12

**Prerequisite:** Auto Body Repair II

Students learn to repair, mask, and refinish vehicles or body components. In addition, they learn the application of primers, sealers, and other prep coats and to practice maintenance and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Automotive Body Technology I—Non-Certified 8679</li> <li>Automotive Body Technology II—Non-Certified 8680</li> <li>Automotive Body Technology III—Non-Certified 8681 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Automotive Body Repair sequence: <ul style="list-style-type: none"> <li>Collision Repair (NOCTI)</li> <li>Collision Repair/Refinishing Technology (NOCTI)</li> <li>Collision Repair &amp; Refinish Technician (any exam) (NATEF)</li> <li>Refinishing Technology Assessment (NOCTI)</li> </ul>	Transportation, Distribution, and Logistics

**Basic Automotive Body Repair 8675**

**Grade Level:** 10 or 11 (1 year)

Students learn fundamental skills associated with safe use of hand and power tools and the use of spray guns to refinish the modern automobile.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Automotive Body Repair 8675 and one of the following: <ul style="list-style-type: none"> <li>Materials and Processes 8433</li> <li>Principles of Technology I 9811</li> </ul>	Basic Automotive Body Repair 8675 and Materials and Processes 8433 or Principles of Technology I 9811 and one of the following: <ul style="list-style-type: none"> <li>Entrepreneurship Education 9094</li> <li>Industrial Cooperative Training 8904</li> </ul>	N/A	Transportation, Distribution, and Logistics

**Automotive Technology I—Certified 8506**

Grade Level: 10 or 11

**Automotive Technology II—Certified 8507**

Grade Level: 11 or 12

**Prerequisite:** Auto Technology I—Certified**Automotive Technology III—Certified 8508**

Grade Level: 12

**Prerequisite:** Auto Technology II—Certified

Students learn to repair fuel, electrical, cooling, brake, drive train, and suspension systems. Instruction is given also in the adjustment and repair of individual components and systems such as radiators, transmission, and carburetors. Programs are certified by ASE, allowing students to prepare for the following certification, depending on local program content: Automotive Technician, Engine Machinist, Medium and Heavy Truck Technician, School bus Technician, and Parts Specialist—Automotive or Medium/Heavy Truck.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Automotive Technology I—Certified 8506</li> <li>• Automotive Technology II—Certified 8507</li> <li>• Automotive Technology III—Certified 8508 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Automotive Technology sequence: <ul style="list-style-type: none"> <li>• Automotive Technician (ASE)</li> <li>• Automotive Youth Education Systems Exit Examinations (AYES)</li> <li>• National Automotive Technicians Education Foundation (NATEF) End of Program Test Series Examinations (NATEF)</li> <li>• Parts Specialist: Automobile or Medium/Heavy Truck (ASE)</li> </ul>	Transportation, Distribution, and Logistics

**Automotive Servicing I—Non-Certified 8710**

Grade Level: 10 or 11

**Automotive Servicing II—Non-Certified 8711**

Grade Level: 11 or 12

**Prerequisite:** Auto Servicing I**Automotive Servicing III—Non-Certified 8712**

Grade Level: 12

**Prerequisite:** Auto Servicing II

Students learn to make minor repairs, tune engines, and practice routine maintenance procedures. The study of electrical systems and components of the cooling system is included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Automotive Servicing I—Non-Certified 8710</li> <li>Automotive Servicing II—Non-Certified 8711</li> <li>Automotive Servicing III Non-Certified 8712 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Automotive Servicing sequence: <ul style="list-style-type: none"> <li>Automotive Technician (ASE)</li> <li>Automotive Youth Education Systems Exit Examinations (AYES)</li> <li>National Automotive Technicians Education Foundation End of Program Test Series Examinations (NATEF)</li> <li>Parts Specialist: Automobile or Medium/ Heavy Truck (ASE)</li> </ul>	Transportation, Distribution, and Logistics

### Automotive Maintenance 8709

**Grade Level:** 10 or 11 (1 year)

Students enrolled in this course learn fundamental skills associated with engine tune-up, electrical diagnosis and repair, lubrication and cooling system diagnosis and repair, brake system diagnosis and repair, basic fuel system diagnosis and repair, basic suspension system diagnosis and repair, and basic routine maintenance of automobiles.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Automotive Maintenance 8709 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>Principles of Technology I 9811</li> <li>Power and Transportation 8445</li> <li>Energy and Power 8448</li> </ul>	Automotive Maintenance 8709 <b>and</b> Principles of Technology I 9811 <b>or</b> Power and Transportation 8445 <b>or</b> Energy and Power 8448 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>Entrepreneurship Education 9094</li> <li>Industrial Cooperative Training 8904</li> </ul>	N/A	Transportation, Distribution, and Logistics

### Diesel Equipment Technology I 8613

Grade Level: 10 or 11

### Diesel Equipment Technology II 8614

Grade Level: 11 or 12

**Prerequisite:** Diesel Equipment Technology I

### Diesel Equipment Technology III 8615

Grade Level: 12

**Prerequisite:** Diesel Equipment Technology II

Students receive instruction in general maintenance and overhaul of diesel equipment. They learn to inspect, maintain, and repair tracks, wheels, brakes, operating controls, pneumatic and hydraulic systems, electrical circuitry, and engines. They practice welding and brazing techniques.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>Diesel Equipment Technology I 8613</li> <li>Diesel Equipment Technology II 8614</li> <li>Diesel Equipment Technology III 8615 <b>or</b> ICT 8904 if needed for local scheduling option</li> </ul>	Diesel Engine Mechanics Assessment (NOCTI)	Transportation, Distribution, and Logistics

**Motorsports Technology I 8509**

Grade Level: 10 or 11

**Motorsports Technology II 8510**

Grade Level: 11 or 12

**Prerequisite:** Motorsports Technology I**Motorsports Technology III 8511**

Grade Level: 12

**Prerequisite:** Motorsports Technology II

Motorsports Technology includes instruction in the principles of racecar fabrication and all facets of the racing industry. Technical facets of the course include chassis preparation, engine machine technology, racing protocol, and regulatory compliance. Business aspects of the motor sports industry are also included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Motorsports Technology I 8509</li> <li>• Motorsports Technology II 8510</li> <li>• Motorsports Technology III 8511 or ICT 8904 if needed for local scheduling option</li> </ul>	N/A	Transportation, Distribution, and Logistics

**Small Engine Technology I 8725**

Grade Level: 10 or 11

**Small Engine Technology II 8726**

Grade Level: 11 or 12

**Prerequisite:** Small Engine Technology I**Small Engine Technology III 8727**

Grade Level: 12

**Prerequisite:** Small Engine Technology II

Students learn to maintain and repair small internal-combustion engines used on portable power equipment such as lawnmowers, chain saws, rotary tillers, motorcycles, and snowmobiles, and other 2- and 4 cycle engines.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> <li>• Small Engine Technology I 8725</li> <li>• Small Engine Technology II 8726</li> <li>• Small Engine Technology III 8727 or ICT 8904 if needed for local scheduling option</li> </ul>	Available upon completion of Small Engine Technology sequence: <ul style="list-style-type: none"> <li>• Air Cooled Gas Engine Repair (NOCTI)</li> <li>• Outdoor Power Equipment Certification (EETC)</li> </ul>	Transportation, Distribution, and Logistics

**Small Engine Repair 8724**

Grade Level: 10 or 11 (1 year)

Students enrolled in this program learn skills associated with general maintenance and repair of lawnmowers, rotary tillers and portable power equipment.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Small Engine Repair 8724 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Agricultural Power and Equipment 8016</li> <li>• Small Engine Repair 8082</li> </ul>	Basic Small Engine Repair 8724 <b>and</b> Agricultural Power and Equipment 8016 <b>or</b> Small Engine Repair 8082 <b>and</b> one of the following: <ul style="list-style-type: none"> <li>• Entrepreneurship Education 9094</li> <li>• Industrial Cooperative Training 8904</li> </ul>	N/A	Transportation, Distribution, and Logistics

## Cooperative Education

---

### Industrial Cooperative Training—non co-op 8901

Grade Level: 10

### Industrial Cooperative Training I—co-op 8902

Grade Level: 11 or 12

### Industrial Cooperative Training II—co-op 8903

Grade Level: 12

Prerequisite: ICT I

### Industrial Cooperative Training—Senior Intensified Program 8904

Grade Level: 12

Students have the opportunity to prepare for employment related to the many fields within the areas of trade, industrial, or technical occupations. Each student receives on-the-job training and instruction related to his or her chosen trade area. The ICT SIP program can be operated as an extension of any day-trade program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• ICT 8901 (non co-op)</li> <li>• ICT 8902 (co-op)</li> </ul>	<ul style="list-style-type: none"> <li>• ICT 8901 (non co-op)</li> <li>• ICT 8902 (co-op)</li> <li>• ICT 8903 (co-op)</li> </ul>	N/A	Choose the family most closely aligned to the content of the course.

## Special Programs

---

### Trade and Industrial Education Dual Enrollment with Postsecondary 8801

Information is available from the Trade and Industrial Education Service, Virginia Department of Education.



## Section 8

# Career Connections: 2006-2007

### **Need course information?**

- ❑ Course Descriptions
- ❑ Course Sequences
- ❑ Certifications, Licenses, and Assessments
- ❑ Career Clusters





## Section 8: Career Connections Course Descriptions, Sequences, Career Clusters

### Section Overview

---

This section presents course information applicable to the Career Connections service area: course descriptions, course concentration and specialization sequences, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

#### Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

#### Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations..

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

### Education for Employment (EFE)

---

**Introduction 9075** (for Students Identified as Disadvantaged—18 weeks)

**Introduction 9076** (for Students Identified as Disadvantaged—other than 18 weeks)

**Introduction 9082** (for Students with Disabilities—18 weeks)

**Introduction 9083** (for Students with Disabilities—other than 18 weeks)

**Grade Level:** 6, 7, 8, 9

Students explore independent living and workplace skills by identifying individual assets, interests, aptitudes, social and emotional skills, and potential/realistic occupational skills. Through practical experiences related to daily living and work, students determine strategies to identify and develop their assets and ways to emphasize their strengths at home, school, and in the workplace.

- Level I 9077** (for Students Identified as Disadvantaged—18 weeks)
- Level I 9078** (for Students Identified as Disadvantaged—other than 18 weeks)
- Level I 9084** (for Students with Disabilities—18 weeks)
- Level I 9085** (for Students with Disabilities—other than 18 weeks)

**Grade Levels:** 9, 10, 11

Students investigate various occupational fields, examine occupational requirements, and select a career pathway. They begin to focus on improving and gaining skills required for specific occupations and practice solving real-world problems in the home, in school, and in the workplace. Levels I and II include a 36-week Cooperative Education option.

- Level II 9079** (for Students Identified as Disadvantaged—18 weeks)
- Level II 9080** (for Students Identified as Disadvantaged—other than 18 weeks)
- Level II 9086** (for Students with Disabilities—18 weeks)
- Level II 9087** (for Students with Disabilities—other than 18 weeks)

**Grade Levels:** 10, 11, 12

Students begin to make the transition from school to work by gaining technical skills, conducting a job search, and maintaining successful employment by demonstrating positive work traits and attitudes and continuing to develop technical skills. They focus on balancing their roles of worker, family member, and citizen. Levels I and II include a 36-week Cooperative Education option.

Concentration Sequences	Specialization Sequences	Career Cluster
<ul style="list-style-type: none"> <li>• EFE I and EFE II or</li> <li>• EFE I and EFE Co-op I</li> </ul>	N/A	Education and Training

- EFE Cooperative Education I 9020** (for Students Identified as Disadvantaged)
- EFE Cooperative Education I 9030** (for Students with Disabilities)
- EFE Cooperative Education II 9021** (for Students Identified as Disadvantaged)
- EFE Cooperative Education II 9031** (for Students with Disabilities)

**Recommended Grade Levels:** 11, 12

This option replaces WECEP (Work Experience Cooperative Education Program)

Students receive school-based and community-based instruction organized around an approved job that leads toward their career goal. The teacher-coordinator, on-the-job training sponsor, parent, and student develop an individualized training plan that identifies learning experiences according to the student's occupational objective. The on-the-job paid training is an extension of the classroom instruction coordinated by the classroom teacher into a coherent set of performance objectives and skills.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> <li>• EFE Co-op I and II or</li> <li>• EFE I and EFE Co-op I</li> </ul>	N/A	Available upon completion of EFE Co-op I or II: <ul style="list-style-type: none"> <li>• National Professional Certification in Customer Service (National Retail Federation Foundation)</li> </ul>	Education and Training

## Career Exploration and Investigation

---

### Careers and You 8475

**Grade Level:** 6 or 7 (9, 18, or 36 weeks, single period)

Elementary or middle school students may enroll in this course prior to taking career and technical or career exploratory courses. They investigate the 16 career clusters designated by the U.S. Office of Education by focusing on

- understanding oneself in relation to work
- understanding and simulating work styles (mechanical, conventional, enterprising, social, investigative, and creative)
- identifying and simulating selected careers
- planning for future exploratory courses or activities.

Concentration Sequences	Specialization Sequences	Career Cluster
N/A: This course may be taught within any program area.	N/A	Education and Training

### Career Pathways (Career Exploration) Phase 1 9070

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 1 prepares students to be "career investigators." To obtain the title, students must assess their role in society, identify their role as a worker, analyze their personal assets, complete a basic exploration of career clusters and select career fields or occupations for further study, and secure a career investigator (job shadowing) position with a local employer.

### Career Pathways (Career Skills) Phase 2 9071

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 2 consists of an in-depth study of one to four or more career clusters through a variety of investigative activities with local employers. Students observe, analyze, and report on the demand for workers, worker qualifications, organizational structures, quality control measures, selected policies and regulations, ethical issues, and rewards of work. Students who complete Phase 2 successfully qualify to become "career analysts."

### Career Pathways (Career Match) Phase 3 9072

**Grade Levels:** 11-12 (Time and schedule locally determined)

In Phase 3, students match their interests and aptitudes with occupational information, investigate a variety of pathways to career success, and reinforce the skills and knowledge needed for paid employment, particularly in the challenging 21st-century workplace. Pathways may include paid or volunteer employment experiences while the student is still in high school; continuing education opportunities such as college degree programs, apprenticeships, two-year specialized Tech Prep programs, or military experience; or any combination that will enhance progress toward a career goal.

Concentration Sequences	Specialization Sequences	Career Cluster
N/A: This instruction may be infused into any program area or treated as an across-the-board offering.	N/A	Education and Training

## Entrepreneurship

---

### Exploring Entrepreneurship 9093

**Grade Levels:** 9-12 (18 weeks)

Students explore qualities of individual enterprise, or the art of succeeding in a career. They develop skills needed to advance in an ever-changing work environment. Specifically, students develop competencies in decision making, long-range planning, effective communication, accountability, responsibility, and continuing education. Both individual development and business plan development are examined as concurrent career pathways.

### Entrepreneurship Education 9094

**Grade Levels:** 11-12 (36 weeks)

This course is designed for students who wish to concentrate on strategies for career development through ownership/management of their own businesses. Although individual skills are emphasized, the focus of the course is on development of a business plan, including the following: Determination of type of business enterprise, legal considerations, location selection, financing, steps in getting the enterprise started, marketing strategy, and interaction with successful entrepreneurs.

Concentration Sequences	Specialization Sequences	Career Cluster
Entrepreneurship courses can be combined with appropriate content courses for a CTE program mix. However, entrepreneur courses do not count toward a concentration.	Entrepreneurship courses can be combined with appropriate content courses for a CTE program mix. However, entrepreneur courses do not count toward a specialization.	Marketing, Sales, and Service

## Leadership

---

### Introduction to Leadership 9091

**Grade Levels:** 9-10 (18 weeks)

This course equips students with individual and group leadership skills. Course content includes leadership principles, officer training, parliamentary law, public speaking, effective communication, positive public relations skills, and techniques of organizing and conducting group meetings and activities. Students are encouraged to be active members of a community or school organization.

### Leadership Development 9092

**Grade Levels:** 11-12 (18 to 36 weeks)

Students develop competencies in identifying individual aptitudes in relation to effective leadership skills, understanding organizational behavior, using effective communication in the workplace, handling human resources and organizational problems, supervising and training employees, resolving conflict, and planning for the future. Continuing education in leadership is emphasized as well as practical leadership experiences in cooperation with school and community leaders.

Concentration Sequences	Specialization Sequences	Career Cluster
Leadership courses can be combined with appropriate content courses for a CTE program mix. However, leadership courses do not count toward a concentration.	Leadership courses can be combined with appropriate content courses for a CTE program mix. However, leadership courses do not count toward a specialization.	Education and Training

## Teacher Cadet Program

---

### ProTeam 9060/9061

**Grade Level:** 7 or 8

ProTeam is an exploratory class for students in grades 7 and 8 with a career interest in teaching and education. The curriculum is designed to help students set realistic goals that include the steps to prepare for successful completion of high school and college, including an emphasis on career development competencies. The eight course modules are *I Can Self-Reflect*, *I Can Communicate*, *I Can Teach Others*, *I Can Be Different*, *I Can Make Decisions*, *I Can Set Goals*, and *I Can Think Positively*. The course has an emphasis on service learning, cooperative work groups, teaching-like experiences, and family involvement. This program shall be articulated with a Teacher Cadet program at the high school.

### Teacher Cadet 9062

**Grade Level:** 12 (36 weeks)

The Teacher Cadet course introduces seniors to a career in teaching and education. The primary elements of the curriculum components are *the learner*, *the school*, and *the teacher and teaching*. The components are intentionally broad in scope and provide a great deal of flexibility based on the career interest of a student. In addition to the fundamental curriculum components, all students are required to participate in an internship outside the teacher cadet classroom. The internship may involve the pre-school level through grade 12.

Concentration Sequences	Specialization Sequences	Career Cluster
Teacher Cadet (9062) (36 weeks) <b>and</b> two of the following 18-week courses: <ul style="list-style-type: none"> <li>• Individual Development 8209</li> <li>• Introduction to Early Childhood Education 8233</li> <li>• Introduction to Leadership 9091</li> <li>• Leadership Development 9092</li> <li>• Life Planning 8226</li> <li>• Parenting 8231</li> </ul>	N/A	Education and Training
Teacher Cadet (9062) (36 weeks) and one of the following 36-week courses: <ul style="list-style-type: none"> <li>• Early Childhood Education I 8285</li> <li>• Early Childhood Education II 8286</li> <li>• Individual Development 8210</li> <li>• Introduction to Early Childhood Education 8234</li> <li>• Leadership Development 9092</li> <li>• Life Planning 8227</li> <li>• Parenting 8232</li> </ul>		





## **Section 9: Verified Credits, Diploma Seals, and Board-Approved Credentials 2006-2007**

### **Substitute Examinations for CTE Students**

- Student-Selected Verified Credit
- Career and Technical Education Seal
- Advanced Mathematics and Technology Seal





## Section 9: Verified Credits, Diploma Seals, and Board-Approved Credentials

### Standard and Verified Credits

---

A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.

A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.

A *student-selected verified credit* is a credit for a course that includes a test approved by the Virginia Board of Education. (According to SOA 8 VAC 20-131-110.B, footnote 5: A student may utilize additional tests for earning verified credit in computer science, technology, or other areas as prescribed by the Board in 8 VAC 20-131-110.B.)

#### Student-Selected Verified Credit in Career and Technical Education

A student must successfully complete

- a course or course sequence that prepares him or her to earn a Board-approved credential, **and**
- the assessment required by the certifying or licensing agent.

In November 2005, the Board of Education approved selected industry certification, state licenses, and occupational competency assessments (credentials) for use in awarding student-selected verified credit in approved career and technical education courses or course sequences. These student-selected verified credits are valid for the 2005-2006 school year. The list in this section will be updated when the Board approves credentials during the 2006-2007 school year.

#### Criteria for Earning Student-Selected Verified Credit

Student-selected verified credit will be awarded for credential examinations that meet all of the following criteria:

- Industry certification or licensure examinations that are approved to satisfy the requirements for the Board of Education's Career and Technical Education Seal and/or the Board of Education's Seal of Advanced Mathematics and Technology will satisfy requirements for student-selected verified credits.
- Occupational competency assessments from the National Occupational Competency Testing Institute (NOCTI) are approved for verified credit only.
- **Teacher Certification Requirements:** For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure. In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. Exception: There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.
- A standard credit may not be verified more than once.

One student-selected verified credit will be awarded for passing each certification or licensure examination or occupational competency assessment that meets all of the above criteria if the student earns only one standard unit of credit in the career and technical education concentration or specialization.

Two student-selected verified credits will be awarded for passing each certification or licensure examination or occupational competency assessment that meets all of the above criteria if the student

- meets the CTE concentration or specialization course requirements for program completer, and
- earns at least two standard units of credit in the CTE concentration or specialization.

## Diploma Seals

---

In September 2000, the Board of Education approved criteria for selecting and approving certifications and licenses to satisfy the requirements for the Career and Technical Education Seal and the Advanced Mathematics and Technology Seal.

The examination must be in a CTE field that confers a certification from a recognized industry, trade, or professional association. For the technology requirements of the Board's Seal of Advanced Mathematics and Technology, students may elect to pass a Board-approved exam that confers college-level credit in a technology or computer science area.

- The examination must be standardized and graded independently of the school or school division in which the student is enrolled.
- The examination must be knowledge-based.
- The examination must be administered on a multi-state or international basis.
- The course of study for which the student receives a certification must be designed to prepare the student for an occupation or occupational area or for the college-level credit in an occupation or occupational area.

To earn a *Career and Technical Education Seal*, a student must

- fulfill the requirements for either a standard or advanced studies diploma, and
- complete a prescribed sequence of courses in a CTE concentration or specialization, and
- maintain a B or better average in CTE courses, *or*
- pass an exam that confers certification from a recognized industry, trade, or professional association or
- acquire a professional license in a career and technical field.

To earn an *Advanced Mathematics and Technology Seal*, a student must

- fulfill the requirements for either a standard or advanced studies diploma, and
- satisfy all mathematics requirements for the Advanced Studies Diploma with a B average or better, and
- pass an exam that confers certification from a recognized industry, trade, or professional association, *or*
- pass an exam approved by the Board that confers college-level credit in a technology or computer science area.

## Credentials That Meet Board Criteria for Student-Selected Verified Credit and Diploma Seals

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
A+ Certification	CompTIA	x	x	x
A+ Certification: Operating Systems Technologies Examination	CompTIA	x	x	x
A+ Certification: Core Hardware Examination	CompTIA	x	x	x
ACCESS	American Culinary Federation, Inc. (ACF)	x	x	
Accounting (Basic) Assessment	National Occupational Competency Testing Institute (NOCTI)	x		
Accounting (Complete) Assessment	NOCTI	x		
Administrative Assisting Assessment	NOCTI	x		
Adobe Certified Expert	Adobe Systems Incorporated	x	x	x
Advanced Concepts of Business and Marketing Certificate	ASK Institute (DECA/MarkED)	x	x	
Advertising and Design Assessment	NOCTI	x		
Agriculture Mechanics Assessment	NOCTI	x		
Air Conditioning Certification	HVAC Excellence	x	x	
Air Cooled Gas Engine Assessment	NOCTI	x		
Architectural Drafting Assessment	NOCTI	x		
Audio-Visual Communications Assessment	NOCTI	x		
AutoCAD Certifications (includes 2000, 2002, 2004)	Brainbench	x	x	
Automotive Technician (any exam from Automobile Test Series)	National Institute for Automotive Excellence (ASE)	x	x	
Automotive Youth Education Systems (AYES) Exit Examinations (Pass any two exit exams)	Automotive Youth Education Systems	x	x	
Barber License	Virginia Board of Barbers and Cosmetology	x	x	
Basic Principles of Construction: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	x	x	
BICSI Registered Installer, Level 1	BICSI (International Telecommunications Association)	x	x	
CAD Assessment	NOCTI	x		
Brainbench Desktop Publishing Certifications (Pass any one test in this category.)	Brainbench	x	x	x

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
Brainbench Network Administration Certifications (Pass any one test in this category.)	Brainbench	X	X	X
Brainbench Software Development Certifications (Pass any one test in this category.)	Brainbench	X	X	X
Brainbench Systems Administration Certification (Pass any one test in this category.)	Brainbench	X	X	X
Brainbench Technical Support Certifications (Pass any one test in this category.)	Brainbench	X	X	X
Brainbench Web Administration Certifications (Pass any one test in this category.)	Brainbench	X	X	X
Brainbench Web Design and Development Certifications (Pass any one test in this category.)	Brainbench	X	X	X
Cabinetmaking Assessment	NOCTI	X		
Carpentry Assessment	NOCTI	X		
Carpentry, National Construction Career Test	National Center for Construction Education & Research (NCCER)	X	X	
Carpentry Level One, National Construction Career Test	NCCER	X	X	
Carpentry: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	X	X	
Certification for Legal Professionals (ALS)	The Association for Legal Professionals	X	X	
Certified Computer Service Technician (CST)	Electronics Technicians Association (ETA)	X	X	X
Certified Dental Assistant: Infection Control Examination (ICE)	Dental Assisting National Board, Inc.	X	X	
Certified Dental Assistant: Radiation Health and Safety Examination (RHS)	Dental Assisting National Board, Inc.	X	X	
Certified Electronics Technician Associate (CETA)	ETA	X	X	
Certified Fiber Optics Installer	The Association of Communications and Electronics Schools, International	X	X	
Certified Internet Webmaster Associate	ProsoftTraining	X	X	X
Certified Internet Webmaster Associate: Internet Business Foundations Examination	ProsoftTraining	X	X	X
Certified Internet Webmaster Associate: Network Technology Foundations Examination	ProsoftTraining	X	X	X

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
Certified Internet Webmaster Associate: Site Development Foundations Examination	ProsoftTraining	X	X	X
Certified Internet Webmaster Professional	ProsoftTraining	X	X	X
Certified Novell Administrator (CNA)	Novell	X	X	X
Certified Satellite Dish Installer	ETA	X	X	
Cisco CCNA Academy Certificate (any two end-of-course exams, Levels 1-4)	Cisco Systems	X	X	X
Cisco CCNA Examination: Interconnecting Cisco Networking Devices	Cisco Systems	X	X	X
Cisco CCNA Examination: Introduction to Cisco Networking Devices	Cisco Systems	X	X	X
Cisco Certified Networking Associate	Cisco Systems	X	X	X
Collision Repair	NOCTI	X		
Collision Repair and Refinishing Technician (ASE) (any exam from Collision Repair and Refinish Test Series)	NATEF	X	X	
Collision Repair and Refinishing Technology	NOCTI	X		
Commercial Air Conditioning Certification	HVAC Excellence	X	X	
Commercial Foods Assessment	NOCTI	X		
Commercial Pesticide Applicator Certification	Virginia Department of Agriculture and Consumer Services	X	X	
Commercial Refrigeration Certification	HVAC Excellence	X	X	
Construction Electricity Assessment	NOCTI	X		
Construction Masonry—Blocklaying Assessment	NOCTI	X		
Construction Masonry—Bricklaying Assessment	NOCTI	X		
Copper Based Cabling Certification	RBT Systems, Inc.	X	X	
Core: Introductory Craft Skills, National Construction Career Test	NCCER	X	X	
Cosmetology License	Virginia Board of Barbers and Cosmetology	X	X	
Cosmetology	NOCTI	X		
Criminal Justice	NOCTI	X		
Customer Support Specialist Certification	Help Desk Institute	X	X	X
Data Cabling Installer Certification	ETA	X	X	
Dental Assisting Assessment	NOCTI	X		
Diesel Engine Mechanics Assessment	NOCTI	X		

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
Drafter Certification	American Design Drafting Association	x	x	
Early Childhood Care & Education Assessment	NOCTI	x		
Electrical Certification	HVAC Excellence	x	x	
Electrical Construction Assessment	NOCTI	x		
Electric Heat Certification	HVAC Excellence	x	x	
Electrical, National Construction Career Test	NCCER	x	x	
Electrical Principles: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	x	x	
Electronic Technology Assessment	NOCTI	x		
Emergency Medical Technician	Virginia Department of Health, Office of Emergency Services	x	x	
EPA Technician Certification (Core, I, II, III)	Environmental Protection Agency (Authorized Testing Entity)	x	x	
Fiber Optic Network Cabling Certification	RBT Systems, Inc.	x	x	
Fiber Optics Installer Certification	ETA	x	x	
Firefighter I Certification	Virginia Department of Fire Programs	x	x	
Food Production, Management, and Services Assessment	NOCTI	x		
Floriculture—Greenhouse Assessment	NOCTI	x		
Forestry Products & Processing Assessment	NOCTI	x		
Fundamental Concepts of Business and Marketing Certificate	ASK Institute (DECA/MarkED)	x	x	
Fundamentals of Wireless LANs Certificate	Cisco Systems	x	x	x
Gas Heat Certification	HVAC Excellence	x	x	
General Drafting and Design Assessment	NOCTI	x		
Graphic Communications Technology Assessment	NOCTI	x		
Graymark Cable Installation Certification	Graymark International	x	x	
Greenhouse Operators Certification Program	Southeast Greenhouse Growers Association	x	x	
Health Assisting Assessment	NOCTI	x		
Heat Pump Certification	HVAC Excellence	x	x	
Heating, Electrical, Air Conditioning Technology (HEAT) Examination	HVAC Excellence	x	x	
House Wiring: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	x	x	

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
HVAC: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	x	x	
Home Health Aide Assessment	NOCTI	x		
Horticulture – Floriculture Assessment	NOCTI	x		
Horticulture – Landscaping Assessment	NOCTI	x		
Horticulture – Olericulture Assessment	NOCTI	x		
Hospitality Management – Food and Beverage Option Assessment	NOCTI	x		
Hospitality Management – Lodging Option	NOCTI	x		
HVAC, National Construction Career Test	NCCER	x	x	
Industrial Maintenance Mechanic Assessment	NOCTI	x		
IC <sup>3</sup> (Internet and Computing Core Certification)	Certiport	x	x	x
iNet+	CompTIA	x	x	x
Installer Core Certification (HVAC-NATE)	North American Technician Excellence, Inc. (NATE)	x	x	
International Computer Driving License (ICDL)	ICDL US	x	x	x
IT Essentials Certificate, Level 1	Cisco Systems	x	x	x
IT Essentials Certificate, Level 2	Cisco Systems	x	x	x
Java Programming Examination	Cisco Systems	x	x	x
Light Commercial Heating & Air Conditioning	Air Conditioning and Refrigeration Institute (ARI)	x	x	
Linux+ Certification Program	CompTIA	x	x	x
Lodging Management Program Certification, Level 1	American Hotel and Lodging Association (AH&LA)	x	x	
Lodging Management Program Certification, Level 2	AH&LA	x	x	
Machining Skills Level 1 (Pass any Machining Level 1 examination with performance component.)	National Institute for Metalworking Skills, Inc. (NIMS)	x	x	
Macromedia Certified Professional	Macromedia	x	x	x
Manufacturing Technology Assessment	NOCTI	x		
Masonry, National Construction Career Test	NCCER	x	x	
Master CIW Administrator	ProsoftTraining	x	x	x
Master CIW Designer	ProsoftTraining	x	x	x
Master CIW Enterprise Developer	ProsoftTraining	x	x	x

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
Master CIW Web Site Manager	ProsoftTraining	X	X	X
Medical Assisting Assessment	NOCTI	X		
Metalworking and Fabrication Assessment	NOCTI	X		
Microsoft Certified Applications Developer	Microsoft	X	X	X
Microsoft Certified Professional (Pass any one MCP exam.)	Microsoft	X	X	X
Microsoft Certified Systems Administrator	Microsoft	X	X	X
Microsoft Certified Systems Engineer	Microsoft	X	X	X
Microsoft Office Specialist (MOS) (Pass any one unique MOS exam at core level.)	Microsoft	X	X	
Nail Technician License	Virginia Board of Barbers and Cosmetology	X	X	
National Automotive Technicians Education Foundation (NATEF) End of Program Test Series Examinations (Pass any two exams.)	NATEF	X	X	
National Health Care Foundation Skills Standards Assessment	NOCTI	X		
National Professional Certification in Customer Service	National Retail Federation Foundation	X	X	
Network+ Certification	CompTIA	X	X	X
NRDA Certification (Dental Assisting)	National Allied Health Registry/National Association for Health Professionals	X	X	
NRDA Certification (Medical Assisting)	National Allied Health Registry/National Association for Health Professionals	X	X	
Nurse Aide	Virginia Board of Nursing	X	X	
Nursing Assisting Assessment	NOCTI	X		
Oil Heat Certification	HVAC Excellence	X	X	
Oracle Certified Program Examinations (Pass any OCP exam.)	Oracle Corporation	X	X	X
Outdoor Power Equipment Certifications (Pass any one Outdoor Power Equipment test.)	Equipment and Engine Training Council (EETC)	X	X	
Parts Specialist (ASE) (any exam from Parts Specialist Test Series)	ASE	X	X	
Plumbing Assessment	NOCTI	X		
Plumbing: Residential Construction Academy Examination	Delmar Thomson Learning/Home Builders Institute	X	X	

Name of Credential/Examination	Issuing Organization	Meets Board of Education Criteria for		
		Student-Selected Verified Credit	Career and Technical Education Seal	Advanced Math and Technology Seal
Precision Machining	NOCTI	x		
Pre-Engineering Assessment	NOCTI	x		
PrintED Certification (any one exam)	Graphic Arts Education and Research Foundation	x	x	
Production Agriculture Assessment	NOCTI	x		
ProStart Program Certification (Levels 1 and/or 2)	Education Foundation of the National Restaurant Association	x	x	
Real Estate Salesperson	Virginia Real Estate Board	x	x	
Refinishing Technology Assessment	NOCTI	x		
Residential Air Conditioning and Heating Certification (ARI)	Air Conditioning and Refrigeration Institute	x	x	
Retail Commercial Baking Assessment	NOCTI	x		
Retail Trades Assessment	NOCTI	x		
SENSE Training Program Certification (Welding)	American Welding Society	x	x	
START Certification	AH&LA	x	x	
Student Electronics Technician Certification (SET)	ETA	x	x	
Sun Certified Programmer for Java 2 Platform	Sun Microsystems	x	x	x
Telecommunications Electronics Technician Certification	ETA	x	x	
Television Broadcasting Assessment	NOCTI	x		
UNIX Examination	Cisco Systems	x	x	x
Virginia Pharmacy Technician Examination	Virginia Board of Pharmacy	x	x	
Visual Communications Assessment	NOCTI	x		
Voice and Data Cabling Certification	Cisco Systems	x	x	x
Web Design Examination	Cisco Systems	x	x	x
Welding Assessment	NOCTI	x		
Welding, National Construction Career Test	NCCER	x	x	
WOW Certified Apprentice Webmaster	World Organization of Webmasters	x	x	x
WOW Certified Web Administrator Apprentice	World Organization of Webmasters	x	x	x
WOW Certified Web Designer Apprentice	World Organization of Webmasters	x	x	x
WOW Certified Web Developer Apprentice	World Organization of Webmasters	x	x	x





## **Section 10: Descriptions of Certifications, Licenses, and Assessments 2006-2007**

### **Overviews of industry-wide or national credentials:**

- Descriptions
- Award Criteria
- Providers
- Preparatory Courses





## Section 10: Descriptions of Certification/License/Assessments

This section presents the credentials approved for student-selected verified credit by the Virginia Board of Education in February 2005 along with brief descriptions and the courses which may prepare a student for the approved examinations. **The relationships between these credentials (industry certifications, licenses, and other assessments), and the criteria for earning verified credit and diploma seals are explained in Section 9: Verified Credits, Diploma Seals, and Board-Approved Credentials.** Section 9 also fully explains the requirements for teacher/program certification.

**Note:** Information Technology certifications may be designated as follows:

\*Considered an entry-level certification

\*\*Considered a mid-level certification; may require significant curriculum mapping

\*\*\*Considered an advanced-level certification; will need to be mapped to curriculum at the academy level

+Specific approved Brainbench assessments by clusters can be found at <http://www.brainbench.com/xml/bb/common/testcenter/subcat.xml?cat1=9>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>A+ Certification**</b>            Certification of competency of entry-level computer service technicians. This is a popular first certification, especially for people who want to enter the information technology (IT) job market.</p>	Pass the following tests: <ul style="list-style-type: none"> <li>• A+ Operating System Technologies examination</li> <li>• A+ Core Hardware Service Technician examination</li> </ul>	CompTIA	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Systems Technology 8622/8623/8624</li> <li>• Electronics Systems I 8416/8417</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8413</li> <li>• Information Technology in Production Systems 8496</li> </ul>
<p><b>A+ Certification** Operating Systems Technologies Examination</b>            An examination that certifies competency in operating systems technologies for entry-level computer service technicians. Examination is considered a “pathway” examination to full A+ Certification.</p>	Pass the following test: <ul style="list-style-type: none"> <li>• A+ Operating System Technologies examination</li> </ul>	CompTIA	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Systems Technology 8622/8623/8624</li> <li>• Electronics Systems I 8416/8417</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8413</li> <li>• Information Technology in Production Systems 8496</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>A+ Certification**</b> <b>Core Hardware Examination</b> An examination that certifies competency in core hardware technologies for entry-level computer service technicians. Examination is considered a “pathway” examination to full A+ Certification.	Pass the following test: <ul style="list-style-type: none"> <li>• A+ Core Hardware Examination</li> </ul>	CompTIA	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Systems Technology 8622/8623/8624</li> <li>• Electronics Systems I 8416/8417</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8413</li> <li>• Information Technology in Production Systems 8496</li> </ul>
<b>ACCESS</b> Certification of knowledge and skill in culinary arts	Pass a written exam focusing on application of concepts and tasks performed by chefs and cooks (either food/meal or pastry specialty).	American Culinary Federation, Inc. (ACF)	Choose one of the following: <ul style="list-style-type: none"> <li>• Culinary Arts 8521/8522/8523</li> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> </ul>
<b>Accounting (Basic) Assessment</b> Occupational competency assessment of skills and knowledge covered in a basic secondary level accounting program	Pass the NOCTI knowledge-based exam, Accounting—Basic (2000), consisting of 114 test items. Test includes journalizing and posting, payroll preparation, banking and banking procedures, automated accounting, merchandise inventory, and completing the accounting cycle.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321</li> </ul>
<b>Accounting—Complete Assessment</b> Occupational competency assessment of skills and knowledge covered in an advanced secondary level accounting program	Pass the NOCTI knowledge-based exam, Accounting—Complete Assessment (2900), consisting of 159 test items. Test includes journalizing and posting, payroll preparation, banking and banking procedures, automated accounting, merchandise inventory, completing the accounting cycle, and advanced accounting principles.	National Occupational Competency Testing Institute (NOCTI)	<ul style="list-style-type: none"> <li>• Accounting 6320</li> <li>• Advanced Accounting 6321</li> </ul>
<b>Administrative Assisting Assessment</b> Occupational competency assessment of skills and knowledge covered in courses covering office procedures and office/computer applications	Pass the NOCTI knowledge-based exam, Administrative Assisting (3001), consisting of 181 test items. Test includes keyboarding/computer applications, interpersonal/employability skills, records management, office procedures, communication skills, computational skills/accounting, and mail processing.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Applications 6611</li> <li>• Computer Information Systems 6612</li> <li>• Advanced Computer Information Systems 6613</li> <li>• Legal Systems Administration 6735</li> <li>• Medical Systems Administration 6730</li> <li>• Office Administration 6621/6622</li> <li>• Office Specialist 6740/6741/6742</li> <li>• Word Processing 6625</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Adobe Certified Expert*</b>  Certification of a candidate who has passed an Adobe Product Proficiency Exam for a specific Adobe software product. The certified user is considered to be an expert-level user of the software product.</p>	<p>Pass a 1-2 hour product proficiency exam on desired Adobe software product. Exams are computer-delivered, closed-book tests consisting of 60-90 multiple-choice questions. Examples of exams: Adobe Acrobat 5.0, Adobe After Effects 4.1, Adobe FrameMaker 7.0, Adobe GoLive 6.0, Adobe Illustrator 10.0, Adobe InDesign 2.0, Adobe Photoshop 6.0, Adobe Premiere 6.0, Adobe LiveMotion 1.0, Adobe PageMaker 7.0</p>	<p>Adobe Systems, Incorporated</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Graphic Imaging Technology 8660/8661/8662</li> </ul>
<p><b>Advanced Concepts of Business and Marketing Certificate</b>  Certification awarded for advanced levels of competency, based on business-derived standards, in core business concepts and skills (marketing emphasis) and knowledge of specific business/marketing functions (e.g., selling or industries such as retail or hospitality)</p>	<p>Pass a knowledge-based exam consisting of 125 multiple-choice test items. Test includes items from the following areas: business administration, communication, distribution, economics, financing, marketing-information management, pricing, product management, professional development, promotion, and selling.</p>	<p>ASK Institute (DECA/MarkED)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Adv. Marketing 8130/8131</li> <li>• Adv. Fashion Marketing 8145/8146</li> <li>• Adv. Hotel/Motel Marketing 8162/8163</li> <li>• Adv. Global Marketing and Commerce 8136</li> <li>• Adv. Sports, Entertainment, and Recreation Marketing 8177/8178</li> <li>• Adv. Travel/Tourism Marketing 8167/8168</li> <li>• Financial Services Marketing 8180/8181</li> <li>• Marketing Management 8132</li> </ul>
<p><b>Advertising Design Assessment</b>  Occupational competency assessment of skills and knowledge covered for an instruction program focusing on the advertising design job market sector</p>	<p>Pass the NOCTI knowledge-based exam (2019) consisting of 193 test items. Test includes color, reproduction, typography, tools and equipment, printing surfaces, drawing/illustration, production, computer literacy, photography, communication, skills, and design.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Advertising Design 8570/8571/8572</p>
<p><b>Agriculture Mechanics Assessment</b>  An occupational competency assessment of skills and knowledge covered in a typical Agricultural Mechanics course</p>	<p>Pass the NOCTI knowledge-based exam (1002) consisting of 175 test items. Test includes orientation and safety, agricultural mechanic skills, agricultural power and machinery, agricultural electrical power and processing, agricultural structures, and soil and water treatment.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Introduction to Power, Structural, and Technical Systems 8016</li> <li>• Agricultural Power Systems 8018</li> </ul>
<p><b>Air Conditioning Certification</b>  The basis for all other certifications involving the vapor compression refrigeration system. Today's systems use new refrigerants and oils compared to units built just a few years ago. Any technician responsible for diagnosis and repair must possess a strong background in refrigeration systems.</p>	<p>Pass a written exam focusing on the following: theory of heat, temperature and pressure; physical states of matter and change of state; refrigeration and refrigerants; refrigerant and oil management; refrigeration applied to air conditioning, leak detection, tubing and piping practices, system evacuation, system charging, tool usage and calibration, equipment maintenance, and safety.</p>	<p>HVAC Excellence</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Air Cooled Gas Engine Assessment</b> Occupational competency assessment of skills and knowledge covered in a typical Small Engine Repair course	Pass the NOCTI knowledge-based exam (2068) consisting of 200 test items. Test includes fuel system, lubricating system and carburetion, compression, ignition, governor, engine disassembly, engine assembly, maintenance, engine technology, failure, and starters.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Small Engine Repair 8021/8082</li> <li>• Small Engine Technology 8725/8726/8727</li> </ul>
<b>Architectural Drafting Assessment</b> Occupational competency assessment of skills and knowledge covered in secondary design/drafting programs focusing on architectural drafting.	Pass the NOCTI knowledge-based exam (2004) consisting of 196 test items. Test includes basic drawing skills, performing architectural activities, site/plot plans, sections and details, terms, symbols and abbreviations, supplemental architectural activities, interpreting construction documents, Computer Aided Drafting (CAD), accessibility (ADA) and safety concerns, plans and elevations.	National Occupational Competency Testing Institute (NOCTI)	Drafting 8530/8531/8532
<b>Audio-Visual Communications Technology Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary course that includes audiovisual production and communication content	Pass the NOCTI knowledge-based exam, Audio-Visual Technology Communications Assessment (2005) consisting of 196 test items. Test includes getting started/organization, creating objects, drawing, editing, layers, color and line types, text, dimensioning, blocks, attributes and Xrefs, printing and plotting, and utilities.	National Occupational Competency Testing Institute (NOCTI)	Television Production 8688/8689/8690
<b>AutoCAD Certifications</b>		Brainbench	Choose one of the following: <ul style="list-style-type: none"> <li>• Technical Drawing and Design 8434/8435</li> <li>• Engineering Drawing and Design 8436/8493</li> <li>• Architectural Drawing and Design 8437/8492</li> <li>• Digital Visualization 8459</li> <li>• Drafting 8530/8531/8532</li> </ul>
<b>AutoCAD 2000 Certification</b> Hands-on measure of ability and knowledge to design in two dimensions, using the AutoCAD 2000 software program	Pass an on-line knowledge and software use assessment that covers getting started/organization, creating objects, drawing, editing, layers, color and line types, text, dimensioning, blocks, attributes and Xrefs, printing and plotting, and utilities.		
<b>AutoCAD 2002 Certification</b> Certification of skills and knowledge in using the design/drafting software program, AutoCAD 2002	Pass an interactive, on-line assessment that measures the ability to design in two and three dimensions, using AutoCAD 2002. The test covers annotation, drawing, drawing shapes, drawing view, editing, editing objects, file management, format, inserting objects, and utilities and settings.		
<b>AutoCAD 2004 Certification</b> Certification of skills and knowledge in using the design/drafting software program AutoCAD 2004	Pass an interactive, online assessment that measures the ability to design in two dimensions using AutoCAD 2004. Some of the items in the test contain drawing files that must be opened and manipulated in the AutoCAD software. The test covers Annotation, Drawing, Drawing Shapes, Drawing View, Editing, Editing Objects, File Management, Format, Inserting Objects, and Utilities and Settings.		

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Automotive Technician Examination</b> Certification of skill in automobile service and repair. Examination is considered a “pathway” examination to full ASE certification in a specialty area upon completion of required work experience.</p>	<p>Pass at least <u>one</u> of the following eight specialty exams: engine repair, automatic transmission and transaxle, manual drive train and axles, suspension and steering, brakes, electrical and electronic systems, heating and air conditioning, or engine performance. Verified credit will be awarded for the passing of each certification specialty examination (up to a maximum of four credits).</p>	<p>National Institute for Automotive Service Excellence (ASE)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Technology—Certified 8506/8507/8508</li> <li>• Automotive Servicing—Non-Certified 8710/8711/8712</li> </ul>
<p><b>Automotive Youth Education Systems (AYES) Exit Examinations</b> Certification of skill in automotive service and repair. Examinations are considered “pathway” examinations potentially leading to ASE industry certification.</p>	<p>Verified credit will be awarded for passing any <u>two</u> AYES exit examinations: A4—Steering and Suspension, A5—Brakes, A6—Electrical/Electronics, A8—Engine Performance.</p>	<p>Automotive Youth Educational Systems (AYES)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Technology—Certified 8506/8507/8508</li> <li>• Automotive Servicing—Non-Certified 8710/8711/8712</li> </ul>
<p><b>Barbers</b> Virginia state license to practice the cutting, styling, and care of human hair</p>	<ul style="list-style-type: none"> <li>• Complete the training required by the licensing board as defined in the Code of Virginia.</li> <li>• Pass the written and performance elements of Virginia licensing examination.</li> </ul>	<p>Virginia Board of Barbers and Cosmetology (Department of Professional &amp; Occupational Regulations)</p>	<p>Barbering 8740/8741/8742</p>
<p><b>Basic Principles of Construction: Residential Construction Academy Examination</b> Examination of skills and knowledge covered in the course materials, “Residential Construction Academy: Basic Principles for Construction,” Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures the skills and information necessary for success in a construction career. The examination covers the following: working in the construction industry; safety on the jobsite; scaffolds, ladders, and auxiliary power; whole numbers, decimals, fractions and construction math; linear measure, perimeter area, volume, and right angles; combined operations; fasteners; selection, use and care of common tools; print reading; views, scales, lines, symbols and plan views; elevations, sections, and details.</p>	<p>Thomson Delmar Learning/Home Builders Institute</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Carpentry 8601/8602/8603</li> <li>• Cabinetmaking 8604/8605/8606</li> <li>• Electricity 8533/8534/8535</li> <li>• HVACR 8503/8504/8505</li> <li>• Masonry 8512/8513/8514</li> <li>• Plumbing 8551/8552/8553</li> </ul>
<p><b>BICSI Registered Installer, Level 1</b> Cabling certification based on <i>BICSI Telecommunications Cabling Installation Manual</i>, 2<sup>nd</sup> ed.</p>	<ul style="list-style-type: none"> <li>• Pass a written 2-hour exam made up of 85 multiple choice or true/false questions. The Level 1 passing score is 60%.</li> <li>• Pass a hands-on test, successfully completing two Level 1 Installer tasks to industry standards. This portion of the exam takes approximately 20 minutes per task.</li> </ul>	<p>BICSI (International Telecommunications Association)</p>	<p>Electricity 8533/8534/8535</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Brainbench Network Administration Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to network administration</p>	<p>Pass any <u>one</u> assessment in the Brainbench <b>Network Administration</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge in various areas relating to the architectures and protocols used in local and wide area networks. Examples: Network Monitoring, Network Technical Support, Network Concepts.</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<p><b>Brainbench Systems Administration Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to computer systems administration</p>	<p>Pass any <u>one</u> assessment in the Brainbench <b>Systems Administration</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge in various areas relating to the architectures and protocols used in computer systems and their operational software. Examples: MS Windows XP Desktop Administration, Unix Administration (General), Widows 2000 Desktop Administration, Linux Administration (Red Hat).</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Systems Technology 8622/8623/8624</li> </ul>
<p><b>Brainbench Technical Support Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to technical support for the personal computer end user.</p>	<p>Pass any <u>one</u> assessment in the Brainbench <b>Technical Support</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge in various areas relating to the support of end users of personal computers. Examples: Technical Help Desk (Microsoft), MS Windows 2000 Desktop Administration, Computer Technical Support, MS Windows Server 2003 Administration</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Systems Technology 8622/8623/8624</li> </ul>
<p><b>Brainbench Software Development Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to knowledge of programming languages and practices.</p>	<p>Pass any <u>one</u> assessment in the <b>Software Development</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge of various programming languages and practices. Examples: C++ Fundamentals, Java 2 Fundamentals, JavaScript, Visual Basic 6.0 Fundamentals, Visual Basic.NET, Visual C++</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> <li>• Advanced Database Design and Management 6661</li> <li>• Desktop, Multimedia, and Web Technologies 6630</li> <li>• Advanced Desktop, Multimedia, and Web Technologies 6631</li> </ul>
<p><b>Brainbench Web Design and Development Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to knowledge of all aspects of web development, web page design, programming and scripting languages as well as basic web architecture.</p>	<p>Pass any <u>one</u> assessment in the <b>Web Design and Development</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge of various web design and development tools to include programming and scripting languages. Examples: Dreamweaver MX, Flash MX, Internet Concepts, Internet Technology Fundamentals, HTML 4.0, XML Concepts, Web Design Concepts, Web Development Concepts, MS Front Page 2000, JavaScript 1.5 Fundamentals,</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Brainbench Web Administration Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to knowledge of Internet architecture and the administration of web servers.</p>	<p>Pass any <u>one</u> assessment in the <b>Web Administration</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge of Internet architecture and the administration of web servers. Examples: WWW Concepts, Web Server Administration, Internet Industry Knowledge, E-Commerce Concepts, MS Internet Explorer 4.0</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Advanced Database Design and Management 6661</li> </ul>
<p><b>Brainbench Desktop Publishing Software Certifications*</b>  Certification of knowledge and skills required for one or more skill set areas relating to knowledge of industry-leading graphics, page layout, and publishing software.</p>	<p>Pass any <u>one</u> assessment in the <b>Desktop Publishing Software</b> skill cluster (see +note at top of this section). These assessments provide certification of specific skill set knowledge of industry-leading graphics, page layout, and publishing software. Examples: Adobe Illustrator 8.0, Adobe PageMaker 6.5, Adobe Photoshop 7.0, Macromedia Director 8, Quark Xpress</p>	Brainbench	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Communication Systems 8415</li> <li>• Graphic Communications Systems 8458</li> <li>• Imaging Technology 8455</li> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Graphic Imaging Technology 8660/8661/8662</li> </ul>
<p><b>Cabinetmaking Assessment</b>  Occupational competency assessment of skills and knowledge covered in an instructional program in cabinetmaking</p>	<p>Pass the NOCTI knowledge-based exam (1014) consisting of 168 test items. Test includes: safety, power sawing, drill and drill press, jointer and planer, router and shaper, constructing joints, basic fastening, sanding and finishing, casework design and layout, cutting and shaping casework components, assembling and installing casework, finishing surfaces, transporting and installing casework, and wood lathe.</p>	National Occupational Competency Testing Institute (NOCTI)	Cabinetmaking 8604/8605/8606
<p><b>CAD Assessment</b>  Occupational competency assessment of skills and knowledge covered in a secondary design/drafting program focusing on computer assisted design methods</p>	<p>Pass the NOCTI knowledge-based exam (2973) consisting of 98 test items. Test includes: identify hardware and operating systems; use hardware and operating systems; interpret and read blueprints; create and manipulate mechanical drawing information; draw and design assemblies; and use 3-D modeling.</p>	National Occupational Competency Testing Institute (NOCTI)	Drafting 8530/8531/8532
<p><b>Carpentry: Residential Construction Academy Examination</b>  Examination of skills and knowledge covered in the course materials, "Residential Construction Academy: Carpentry," Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures the skills and knowledge required to work professionally in the residential carpentry area. The examination covers the following: tools and materials; hand and power tools; wood and wood products; fasteners; rough carpentry; blueprints and codes; building layout; concrete form construction; floor, wall and ceiling framing; scaffolds, ladders, and horses; roof framing; exterior finish, windows, and doors; roofing; siding and decks; interior, insulation, and wall finish; stair framing and finish; cabinets and countertops.</p>	Thomson Delmar Learning/Home Builders Institute	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Carpentry 8601/8602/8603</li> <li>• Cabinetmaking 8604/8605/8606</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Carpentry Assessment</b> Occupational competency assessment of skills and knowledge covered for an instructional program in carpentry</p>	<p>Pass the NOCTI knowledge-based exam (2015) consisting of 140 test items. Test includes hand tools, power tools, blueprints and specifications, building materials and fasteners, measuring and layout operations, foundation, forms and concrete, rough framing, exterior finish, interior finish, basic mathematics, and interior system installation.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Carpentry 8601/8602/8603</p>
<p><b>Carpentry, National Construction Career Test</b> Certification of knowledge and skills (defined as Levels 1 and 2 competencies) in the carpentry trade area. The certification exam is based on the NCCER <i>Contren Learning Series</i> standardized curriculum (Carpentry, Levels 1 and 2).</p>	<p>Pass an exam that covers the following: basic safety; introduction to construction math; introduction to hand and power tools; introduction to blueprints; basic communication and employability skills; wood building materials, fasteners, and adhesives; floor systems; wall and ceiling framing; roof framing; windows and exterior doors; reading plans and elevations; site layout one—distance measurement and leveling; introduction to concrete and reinforcing materials; foundations and flatwork; exterior finishing; roofing applications; thermal and moisture protection; stairs; framing with metal studs; interior finish one—doors; interior finish three—window, door, floor, and ceiling trim.</p>	<p>National Center for Construction Education and Research (NCCER)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Carpentry 8601/8602/8603</li> </ul>
<p><b>Carpentry Level One, National Construction Career Test</b> Certification of knowledge and skills defined as Level 1 competency in the carpentry trade area. The certification exam is based on the NCCER <i>Contren Learning Series</i> standardized curriculum (Level 1, Carpentry).</p>	<p>Pass an exam that covers the following: basic safety; introduction to construction math; introduction to hand and power tools; introduction to blueprints; basic communication and employability skills; wood building materials, fasteners, and adhesives; floor systems; wall and ceiling framing; roof framing; windows and exterior doors.</p>	<p>National Center for Construction Education and Research (NCCER)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Carpentry 8601/8602/8603</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Certification for Legal Professionals (ALS)</b> Entry-level certification as an accredited legal professional	Pass an exam with three components: 1) written communication; 2) office procedures and legal knowledge; and 3) ethics, human relations, and judgment.	The Association for Legal Professionals	<ul style="list-style-type: none"> <li>Accounting 6320 or Advanced Accounting 6321 <b>and</b></li> <li>Office Administration 6621 <b>and</b></li> <li>Legal Systems Administration 6735</li> </ul>
<b>Certified Computer Service Technician (CST)</b> Certification of skill in and knowledge of basic computer electronics as applied to computer operation, maintenance, and repair	Pass the written CST certification examination, demonstrating knowledge of basic electronics concepts and principles that form the foundation of all other industry specialty knowledge, skills, and abilities; basic computer hardware operations and problems; and general human/customer relations skills.	Electronics Technicians Association, International (ETA)	Choose one of the following: <ul style="list-style-type: none"> <li>Computer Systems Technology 8622/8623/8624</li> <li>Electronics Technology 8536/8537/8538</li> </ul>
<b>Certified Dental Assistant: Infection Control Examination (ICE)</b> One of three assessments leading to completion of the Certified Dental Assistant credential (CDA)	Pass a knowledge-based exam consisting of 100 multiple-choice questions. The exam includes collection and recording of data, patient and dental health care work education, prevention of cross-contamination and transmission, maintaining aseptic conditions, selecting disinfection or sterilization, performing sterilization procedures, performing disinfection procedures, occupational safety.	Dental Assisting National Board, Inc.	Dental Assistant 8329
<b>Certified Dental Assistant: Radiation Health &amp; Safety Examination (RHS)</b> One of three assessments leading to the complete Certified Dental Assistant credential (CDA)	Pass a knowledge-based exam consisting of 100 multiple-choice questions. The exam includes the intraoral and extraoral processes, mount/label, radiation safety-patient, radiation safety-operator, storage and disposal, quality assurance.	Dental Assisting National Board, Inc.	Dental Assistant 8329
<b>Certified Electronics Technician Associate (CETA)</b> The CETA program is designed for entry-level electronics students, apprentices, or technicians with two years or fewer combined electronics training and/or work experience. It certifies knowledge of basic electronics concepts and principles that form the foundation of all other industry specialty knowledge, skills, and abilities.	This exam is the basic portion of the full credit journey-level certification exam. This multiple-choice exam covers basic electricity, electronics, math, AC & DC circuits, transistors, and basic troubleshooting skills. The Associate level exam is a two-hour exam, and the applicant must receive a score of 75% to pass.	Electronics Technicians Association, International (ETA)	Choose one of the following: <ul style="list-style-type: none"> <li>Electronics Technology 8536/8537/8538</li> <li>Electronics Systems I 8416/8417</li> <li>Electronics Systems II 8412</li> <li>Electronics Systems III 8413</li> </ul>
<b>Certified Fiber Optics Installer</b> Certification for technicians capable of fabricating, installing, troubleshooting, and maintaining fiber optic cable infrastructure	Complete an instructional unit consisting of the <i>Certified Fiber Optics Installer</i> curriculum from The Association of Communications & Electronics Schools, International. Pass an examination based on the following areas: particle and wave theories, optical fiber basics, connectors and components, splicing and cabling installation, optical signal concepts, troubleshooting, and hands-on skills, fiber optics connectorization, splicing, and testing.	The Association of Communications & Electronics Schools, International	Electricity 8533/8534/8535

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Certified Internet Webmaster Associate Certification*</b>            Certification of basic skills and knowledge that an Internet professional is expected to understand and use. This is the first step in the Certified Internet Webmaster (CIW) program.</p>	<p>Pass a CIW Foundations exam (1DO-410). The exam covers Internet fundamentals, Web page authoring fundamentals, and networking fundamentals. Prosoft Learning accepts the iNet+ exam from CompTIA as a substitute for the CIW Foundations exam.</p>	<p>Prosoft Learning Corporation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>
<p><b>Certified Internet Webmaster Associate Examination*</b>            Certification of basic skills and knowledge that an Internet professional is expected to understand and use. This is a “pathway” examination leading to the full Certified Internet Webmaster Associate (CIW) certification.</p>	<p>Pass the Internet Business Foundations Examination (IBF Module). The exam covers basic concepts pertaining to: Information Technology and the Internet, Web Browsing, Multimedia on the Web, Databases and Web Search Engines, E-Mail and Personal Information Management, Internet Services and Tools, Internet Security, and IT Project Management.</p>	<p>Prosoft Learning Corporation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>
<p><b>Certified Internet Webmaster Associate Certification: Site Development Foundations Examination*</b>            Certification of basic skills and knowledge that an Internet professional is expected to understand and use. This is a “pathway” examination leading to the full Certified Internet Webmaster Associate (CIW) certification.</p>	<p>Pass the Site Development Foundations Examination (SDF Module). The exam covers basic concepts pertaining to: Introduction to Web Site Development, Markup Language and Site Development Essentials, XHTML Coding, Horizontal Rules and Graphical Elements, Hyperlinks, Tables, Web Forms, Image Techniques, Frame, GUI HTML Editors, Advanced Web Technologies, and E-Commerce Practices.</p>	<p>Prosoft Learning Corporation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Certified Internet Webmaster Associate Certification: Network Technology Foundations Examination*</b></p> <p>Certification of basic skills and knowledge that an Internet professional is expected to understand and use. This is a “pathway” examination leading to the full Certified Internet Webmaster Associate (CIW) certification.</p>	<p>Pass the Network Technology Foundations Examination (NTF Module). The exam covers basic concepts pertaining to: Introduction to Networking, TCP/IP Suite and Internet Addressing Introduction to TCP/IP, Internetworking Servers, Hardware and Operating System Maintenance.</p>	<p>Prosoft Learning Corporation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>
<p><b>Certified Internet Webmaster Professional**</b></p> <p>Second certification step in the Certified Internet Webmaster (CIW) program of certifications; indicates that an individual has achieved the Certified Internet Webmaster Associate certification and has passed one additional job-role related exam in one of the CIW certification tracks.</p>	<p>Pass the foundation exam for the CIW Associate certification. Pass one job-role related exam in one of the CIW certification tracks.</p>	<p>Prosoft Learning Corporation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>
<p><b>Certified Novell Administrator (CNA)**</b></p> <p>Certification of skills and knowledge for individuals who handle the day-to-day administration of an installed Novell networking product. The CNA is the first step in the Novell certification program.</p>	<p>Pass the Novell exam 050-677, Foundations of Novell Networking. This exam covers topics such as directory services, security, Web services, LAN/WAN technologies, and client/server management.</p>	<p>Novell</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<p><b>Certified Satellite Dish Installer</b></p> <p>Certification of skill in and knowledge necessary to install earth station, TV receive-only satellite dishes for consumer, business, and government use</p>	<p>Pass a test that includes antenna theory, amplifiers, satellite components, reflectors, feeds, wiring and switching, cabling, installation, interfacing, MATV and SMATV systems, fiber optics, and troubleshooting.</p>	<p>Electronics Technicians Association, International (ETA)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electronics Technology 8536/8537/8538</li> <li>• Electricity 8533/8534/ 8535</li> </ul>
<p><b>Cisco CCNA Academy Certificate (CCNA:1)</b></p> <p>Certificate of successful completion of the CCNA 1: Networking Basics course of the CISCO Network Academy Program leading to full certification, Cisco Certified Network Associate (CCNA).</p>	<p>Pass an on-line assessment of competency in the following areas: introduction to networking, networking fundamentals, networking media, cable testing, cabling LANs and WANs, Ethernet fundamentals, Ethernet technologies, Ethernet switching, TCP/IP Protocol Suite, IP addressing, routing fundamentals and subnets, and TCP/IP transport and application layer.</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations I 8542</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Cisco CCNA Academy Certificate (CCNA: 2)</b> A certificate of successful completion of the CCNA 2: Router and Routing Basics course of the CISCO Network Academy Program leading to full certification, Cisco Certified Network Associate (CCNA)</p>	<p>Pass an on-line assessment of competency in the following areas: WANs and routers, introduction to routers, configuring a router, learning about other devices, managing Cisco IOS software, routing and routing protocols, TCP/IP Suite error and control messages, basic router troubleshooting, intermediate TCP/IP, and access control lists (ACLs).</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations II 8543</p>
<p><b>Cisco CCNA Academy Certificate (CCNA: 3)</b> A certificate of successful completion of the CCNA 3: Switching Basics and Intermediate Routing course of the CISCO Network Academy Program leading to full certification, Cisco Certified Network Associate (CCNA)</p>	<p>Pass an on-line assessment that indicates competency in the following areas: introduction to classless routing, single-area OSPF, EIGRP, switching concepts, switches, switch configuration, spanning tree protocol, virtual LANs, and virtual trunking protocol.</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations III 8544</p>
<p><b>Cisco CCNA Academy Certificate (CCNA: 4)</b> A certificate of successful completion of the CCNA 4: WAN Technologies course of the CISCO Network Academy Program leading to full certification, Cisco Certified Network Associate (CCNA)</p>	<p>Pass an on-line assessment that indicates competency in the following areas: scaling IP addresses, WAN technologies, PPP, ISDN and DDR, frame relay, introduction to network administration, optical networking fundamentals.</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations IV 8545</p>
<p><b>Cisco Certified Networking Associate (CCNA)</b> Entry-level certification for workers who install, configure, and operate simple-routed LAN, routed WAN, and switched LAN, and ATM networks that use Cisco routers and switches</p>	<p>Complete the following courses as a part of the CISCO Network Academy Program: CCNA 1: Networking Basics, CCNA 2: Router, CCNA 3: Switching, CCNA 4: WAN Technologies. Pass one comprehensive CISCO certification exam, CCNA Exam 640-507, or two component exams of the CCNA certification.</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations 8542/8543/8544/8545</p>
<p><b>Cisco CCNA Examination: Interconnecting Cisco Networking Devices Examination</b> One of two examinations required for Cisco's entry-level certification for workers who install, configure, and operate simple-routed LAN, routed WAN, and switched LAN, and ATM networks that use Cisco routers and switches</p>	<p>Complete the following courses as a part of the CISCO Network Academy Program: CCNA 1: Networking Basics, CCNA 2: Router, CCNA 3: Switching, CCNA 4: WAN Technologies. Pass the CCNA certification examination: Cisco CCNA Examination: Interconnecting Cisco Networking Devices Examination (640-811)</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations 8544/8545</p>
<p><b>Cisco CCNA Examination: Introduction to Cisco Networking Technologies Examination</b> One of two examinations required for Cisco's entry-level certification for workers who install, configure, and operate simple-routed LAN, routed WAN, and switched LAN, and ATM networks that use Cisco routers and switches</p>	<p>Complete the following courses as a part of the CISCO Network Academy Program: CCNA 1: Networking Basics, CCNA 2: Router. Pass the CCNA certification examination: Cisco CCNA Examination: Introduction to Cisco Networking Technologies Examination (640-821)</p>	<p>Cisco Systems</p>	<p>Computer Networking Hardware Operations 8542/8543</p>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Collision Repair</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in automotive collision repair</p>	<p>Pass the NOCTI knowledge-based exam, Collision Repair (2006), consisting of 186 test items. Test includes welding, sheet metal/panel alignment, plastic repairs, structural, glass, trim and hardware, estimating, safety/environmental, airbags/restraints, air conditioning systems and corrosion protection.</p>	<p>NOCTI</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Body Technology—Certified 8676/8677/8678</li> <li>• Auto Body Repair—Non-Certified 8679/8680/8681</li> </ul>
<p><b>Collision Repair and Refinishing Technician (ASE)</b> Certification of skill in automobile repair and refinishing. Examinations are considered “pathway” examinations to full ASE certification in a specialty area upon completion of required work experience.</p>	<p>Pass any <u>one</u> of four tests covering the following specialty areas in the ASE Collision Repair and Refinish Test Series:</p> <ul style="list-style-type: none"> <li>• Painting and Refinishing exam</li> <li>• Nonstructural Analysis and Damage Repair exam</li> <li>• Structural Analysis and Damage Repair exam</li> <li>• Electrical/Mechanical Components exam</li> </ul>	<p>National Automotive Technicians Education Foundation (NATEF)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Body Technology—Certified 8676/8677/8678</li> <li>• Auto Body Repair—Non-Certified 8679/8680/8681</li> </ul>
<p><b>Collision Repair and Refinishing Technology</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in collision repair and refinishing technology</p>	<p>Pass the NOCTI knowledge-based exam, Collision Repair and Refinishing Technology (1083), which includes 198 test items. Test includes welding, sheet metal repair/panel alignment, plastic repairs, structural, glass, trim and hardware, and detailing, estimating, electronic, safety/environmental, air conditioning, corrosion and corrosion protection, and refinishing.</p>	<p>NOCTI</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Body Technology—Certified 8676/8677/8678</li> <li>• Auto Body Repair—Non-Certified 8679/8680/8681</li> </ul>
<p><b>Commercial Pesticide Applicator Certification Examinations</b> Certification examinations required for applying commercial pesticide in any one of 20 application categories. Assessments are considered to be “pathway” examinations leading toward full certification upon reaching 18 years of age.</p>	<p>Pass a Core Examination as well as <u>one</u> examination in any one of 20 specialty areas in the Commercial Applicator Examination Category. Examples: Agricultural Pest Control—Plant, Agricultural Pest Control—Animal, General Pest Control, Forest Pest Control, Seed Treatment</p>	<p>Virginia Department of Agriculture and Consumer Services</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Agricultural Production Technology 8010</li> <li>• Agricultural Production Management 8012</li> <li>• Introduction to Natural Resources 8040</li> <li>• Natural Resources Business Management 8044</li> <li>• Landscaping 8036</li> <li>• Turf Establishment and Maintenance 8051</li> <li>• Advanced Turf Grass Applications 8054</li> <li>• Horticulture Sciences 8034</li> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Floriculture 8038</li> <li>• Forestry, Wildlife, and Soil Management 8042</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Commercial Air Conditioning Certification</b>  Certification that addresses unique issues involved in the service and maintenance of commercial air conditioning systems. Commercial AC technicians are faced with a variety of equipment and systems. All A/C equipment has certain components and functions that are common to all refrigeration and A/C devices; however, commercial buildings may experience high occupancy and contain equipment leading to indoor air quality (IAQ) concerns.</p>	<p>Pass a written exam focusing on the following: commercial evaporators, commercial condensing units, head pressure controls, charging commercial systems, air distribution, fresh air intake and exchange, filtration (HEPA filters, electronic air filters, activated charcoal air purifiers), generators, humidity control, control of indoor contamination, and duct cleaning.</p>	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<p><b>Commercial Foods Assessment</b>  Occupational competency assessment of skills and knowledge related to commercial foods operations</p>	<p>Pass the NOCTI knowledge-based exam (2020) consisting of 182 test items. Test includes food service overview, sanitation, safety, equipment, production techniques, recipes, purchasing and management skills, menu planning and service.</p>	National Occupational Competency Testing Institute (NOCTI)	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> <li>• Culinary Arts 8521/8522/8523</li> </ul>
<p><b>Commercial Refrigeration Certification</b>  Certification for technicians servicing or maintaining commercial or industrial refrigeration systems. The commercial refrigeration technician is faced with a variety of equipment and an equal variety of troubleshooting and service situations. Electrical and Air Conditioning Certifications are prerequisite to the Commercial Refrigeration Exam.</p>	<p>Pass a written exam focusing on the following: refrigeration components, commercial evaporators, commercial condensing units (head pressure controls), charging commercial systems, refrigerant controls, ice maker controls, defrost timers, pressure regulating valves, grocery (reach-in) cabinets, walk-in cabinets, display cases, frozen food storage, dispensing freezers, and industrial applications.</p>	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<p><b>Construction Electricity Assessment</b>  Occupational competency assessment of skills and knowledge covered in an instructional program in construction electricity</p>	<p>Pass the NOCTI knowledge-based exam (1024) consisting of 186 test items. Test includes: safety, tools, and equipment, NEC/blueprints/planning/ layout, electronics, alternating current (basic theory, circuits, three-phase), transformers, AC motors and starters, branch circuits, wiring methods, lighting, heating and air conditioning, and low voltage.</p>	National Occupational Competency Testing Institute (NOCTI)	Electricity 8533/8534/8535
<p><b>Construction Masonry – Blocklaying Assessment</b>  Occupational competency assessment of skills and knowledge covered in an instructional program in masonry-blocklaying</p>	<p>Pass the NOCTI knowledge-based exam (2025) consisting of 187 test items. Test includes hand and power tools, safety, materials and methods, blueprints and specifications, masonry layout and applications, fireplaces and chimneys, masonry structure maintenance, scaffolding, trade appreciation and human relations, arches, steps, patios and pattern bonds and specialty area of blocklaying.</p>	National Occupational Competency Testing Institute (NOCTI)	Masonry 8512/8513/8514

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Construction Masonry – Bricklaying Assessment</b> Occupational competency assessment of skills and knowledge covered in an instructional program in masonry-bricklaying</p>	<p>Pass the NOCTI knowledge-based exam (2125) consisting of 187 test items. Test includes hand and power tools, safety, materials and methods, blueprints and specifications, masonry layout and applications, fireplaces and chimneys, masonry structure maintenance, scaffolding, trade appreciation and human relations, arches, steps, patios and pattern bonds and specialty area of bricklaying.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Masonry 8512/8513/8514</p>
<p><b>Copper Based Cabling Certification</b> A certification for technicians capable of fabricating, installing, troubleshooting, and maintaining copper cable infrastructure for high speed data services, voice, video, and security information systems. Instructor must be RBT System certified before students can receive certification.</p>	<ul style="list-style-type: none"> <li>• Complete an instructional unit consisting of an RBT Copper Based Network Cabling Certification module.</li> <li>• Pass an examination covering the following areas: safety, hardware, twisted pair cabling and coaxial cabling, cable testing, cabling standards, network cabling installation, and residential and voice cabling.</li> </ul>	<p>RBT Systems, Inc.</p>	<p>Electricity 8533/8534/8535</p>
<p><b>Core: Introductory Craft Skills, National Construction Career Test</b> Certification of knowledge and skills defined as <i>construction fundamentals</i> for all building and construction trade areas. The certification exam will be based upon the NCCER <i>Content Learning Series</i>, “Core Curriculum, Introductory Craft Skills.”</p>	<p>Pass an exam that covers the following: basic safety, employability and communication skills, introduction to construction math, introduction to hand tools, introduction to power tools, introduction to blueprints, and basic rigging.</p>	<p>National Center for Construction Education &amp; Research (NCCER)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Carpentry 8601/8602/8603</li> <li>• Cabinetmaking 8604/8605/8606</li> <li>• Electricity 8533/8534/8535</li> <li>• HVACR 8503/8504/8505</li> <li>• Masonry 8512/8513/8514</li> <li>• Plumbing 8551/8552/8553</li> <li>• Welding 8672/8673/8674</li> </ul>
<p><b>Cosmetology</b> Virginia state license to practice the care and styling of human hair, wigs, and hairpieces</p>	<ul style="list-style-type: none"> <li>• Complete the training required by the licensing board as defined in the Code of Virginia.</li> <li>• Pass the written and performance elements of Virginia licensing examination.</li> </ul>	<p>Virginia Board of Barbers and Cosmetology (Department of Professional &amp; Occupational Regulations)</p>	<p>Cosmetology 8527/8528/8529</p>
<p><b>Cosmetology</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in cosmetology</p>	<p>Pass the NOCTI knowledge-based exam, Cosmetology (1082), consisting of 170 test items. Test includes salon management/accounting; shampooing, conditioning, cutting, styling, coloring, permanent waving, and relaxing hair; skin care, wig services, cleaning and sterilizing equipment, and composition of hair, skin, and nails.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Cosmetology 8527/8528/8529</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Criminal Justice Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in introductory criminal justice/law enforcement.	Pass the NOCTI knowledge-based exam, Criminal Justice (2081), consisting of 175 test items. Test includes crime scene handling, use of force continuum, criminal law and procedures, health issues, police concepts and skills, corrections concepts and skills, court system, communication, security, and understanding and working with special populations.	National Occupational Competency Testing Institute (NOCTI)	Criminal Justice 8702/8703/8704
<b>Customer Support Specialist Certification*</b> Certification of knowledge of customer service, skills required, and readiness to work in the support center industry. A candidate who passes the certification exam is expected to understand the role of the support center professional, best practices for communications, customer service, teamwork, ethics, support center processes, and terminology.	Pass a one-hour, 40-question exam covering the following areas: customer support profession, communications, customer service, problem solving, teamwork, ethics, technical processes, and technology and infrastructure.	Help Desk Institute	Choose one of the following <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<b>Data Cabling Installer Certification</b> Certification of skills and knowledge required of a data cabling installer	Pass an examination that measures knowledge in the following technical areas: basic electricity, data communications basics, definitions, symbols and abbreviations, cable construction, cable performance characteristics, cabling standards, basic network topologies, basic network architectures, NEC and UL requirements, cabling system components, DCIC installation tools, connectors and outlets, cabling system design, cabling installation, connector installation, cabling testing and certification, cabling troubleshooting, and documentation.	Electronics Technicians Association, International (ETA)	Electricity 8533/8534/8535
<b>Dental Assisting Assessment</b> Occupational competency assessment of skills and knowledge covered in a dental assisting instructional program	Pass the NOCTI knowledge-based exam (2026) consisting of 183 test items. Test includes communication, infection control and hazards management, assisting with clinical procedures, performing diagnostic measures and performing clerical functions.	National Occupational Competency Testing Institute (NOCTI)	Dental Assistant 8329
<b>Diesel Engine Mechanics Assessment</b> Occupational competency assessment of skills and knowledge covered in a diesel engine technology program.	Pass the NOCTI knowledge-based exam (2027) consisting of 164 test items. Test includes safety, shop equipment, cooling system, lubricating system, intake and exhaust systems, diesel fuel system, cylinder heads, electrical systems, flywheel, clutch and transmission, general shop practices, air conditioning, and engine troubleshooting, disassembly, rebuilding, testing, and operation.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Diesel Equipment Technology I 8613</li> <li>• Diesel Equipment Technology II 8614</li> <li>• Diesel Equipment Technology III 8615</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Drafter Certification</b> A certification that allows drafters to demonstrate drafting concepts and nationally recognized standards and practices. The certification exam does not require specific knowledge of design and does not cover software specific computer aided drafting (CAD).</p>	<p>Pass an exam that covers drafting concepts as well as nationally recognized standards and practices.</p>	<p>American Design Drafting Association</p>	<p>Drafting 8530/8531/8532</p>
<p><b>Early Childhood Care &amp; Education Assessment</b> Occupational competency assessment of skills and knowledge related to instruction in the early childhood care and education area</p>	<p>Pass the NOCTI knowledge-based exam (2016) consisting of 193 test items. Test includes program management, health and safety, intellectual (cognitive) development. Physical development, social and emotional development, positive adult/child relationships and guidance, positive relationships with families, professionalism, language development and communication, creativity, culturally relevant care and education, observation and documentation of learning, inclusion of children with special needs, and curriculum planning.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Early Childhood Education I 8285</li> <li>• Early Childhood Education II 8286</li> </ul>
<p><b>Electrical Principles: Residential Construction Academy Examination</b> Examination of skills and knowledge covered in the course materials, "Residential Construction Academy: Electrical Principles," Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures important topics that residential electricians need. The examination covers the following: basic electricity and electrical theory; safety; electrical quantities and Ohm's Law; resistors; series, parallel and combination circuits; measuring instruments; using wire tables and determining conductor sizes; alternating current; magnetic induction; inductance in alternating current schedules; resistance-inductive series circuits; resistive-inductive parallel circuits; capacitors; single-phase transformers; and single-phase motors.</p>	<p>Thomson Delmar Learning/Home Builders Institute</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electricity 8533/8534/8535</li> <li>• Building Trades 8515/8516/8517</li> </ul>
<p><b>Electrical Construction Assessment</b> Occupational competency assessment of skills and knowledge related to an electrical construction program.</p>	<p>Pass the NOCTI knowledge-based exam (3030) consisting of 185 test items. Test includes general information; safety; meters, measures, and testing; identification of tools, materials, and components; National Electric Code; blueprints, drawings, diagrams, and symbols; planning; layout and estimating; AC theory; conductors and magnetic theory; electronics; DC; basic electric and electron theories; low voltage systems; wiring; circuits, and installation; raceway and conduit bending; transformers; motors; motor control circuits and PLCs; lighting; and basic computer skills.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electricity 8533/8534/8535</li> <li>• Building Trades 8515/8516/8517</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Electrical Certification</b>  Certification for the HVAC technician who installs, services, troubleshoots, and repairs a variety of electrical circuits and components in today's HVAC systems. Because the vast majority of service calls involve electrical repairs, HVAC Excellence designates Electrical Certification the prerequisite for all other certifications in its program.</p>	<p>Pass a written exam focusing on circuit fundamentals, electrical materials, magnetism, circuit protection, automatic controls components and applications, troubleshooting basic controls, types of electric motors, application of motors, motor controls, and troubleshooting electric motors.</p>	<p>HVAC Excellence</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>
<p><b>Electric Heat Certification</b>  Certification for a technician who services electric heat systems or heat pump systems. It demonstrates competence in all aspects of service and troubleshooting electric heat systems. Electric heat is commonly used as a supplemental heat supply for heat pump systems; hence, it is an excellent supporting certification. Electrical Certification is prerequisite to the Electric Heat exam.</p>	<p>Pass a written exam focusing on the following: principles of electric resistance heating, central forced air electric furnaces, thermostats, controlling multiple stages, contractors for electric furnaces, wiring diagrams, fan motor circuits, and airflow.</p>	<p>HVAC Excellence</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>
<p><b>Electrical, National Construction Career Test</b>  Certification of knowledge and skills defined as Level 1 competency in the residential and commercial/industrial electrical trade area. The certification exam will be based upon the NCCER <i>Content Learning Series</i> standardized curriculum.</p>	<p>Pass an exam that covers the following: electrical safety; hand bending; fasteners and anchors; electrical theory one; electrical theory two; electrical test equipment; introduction to the national electrical code; raceways, boxes, and fittings; conductors; introduction to electrical blueprints; wiring: commercial and industrial; wiring: residential.</p>	<p>National Center for Construction Education &amp; Research (NCCER)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electricity 8533/8534/8535</li> <li>• Building Trades 8515/8516/8517</li> </ul>
<p><b>Electronic Technology Assessment</b>  Occupational competency assessment of skills and knowledge covered in a secondary level program in electronic technology</p>	<p>Pass the NOCTI knowledge-based exam, Electronic Technology (3035), consisting of 192 items. Test includes safety practices, hand tools, alternate current (AC) circuit analysis, communications, direct current (DC) circuit analysis, solid-state device analysis, basic logic function analysis, electronic device applications, analog circuit analysis, digital electronic circuit analysis, fabrication, inspection, and soldering.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electronics Systems I 8416</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8412</li> <li>• Electronics Technology 8536/8537/8538</li> </ul>
<p><b>Emergency Medical Technician</b>  Certification for emergency medical technician (EMT) or first responder</p>	<p>Pass the written and practical elements of a test focusing on emergency treatment of victims of accident, injury, or illness.</p>	<p>Department of Health, Office of Emergency Medical Services</p>	<p>Emergency Medical Technology 8334</p>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>EPA Technician Certification (Exams: Core, I, II, or III)</b>            Certification that is required by Section 608 of the Clean Air Act for anyone who maintains, services, repairs, or disposes of appliances which contain refrigerants with CFCs or HCFCs. Certification must be administered by an EPA-approved testing organization (e.g., Air Conditioning and Refrigeration Institute—ARI).</p>	<p>Pass testing required for the mandatory EPA Technician Certification. Includes a complete review of the final EPA regulations implementing Section 608 of Clean Air Act. Recovery, recycling, reclamation, and proper handling of refrigerants and other information needed.</p>	<p>Environmental Protection Agency (Authorized Testing Entity)</p>	<ul style="list-style-type: none"> <li>• Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</li> <li>• Industrial Maintenance Technology 8575/8576/8577</li> </ul>
<p><b>Fiber Optic Network Cabling Certification</b>            A certification for technicians capable of fabricating, installing, troubleshooting, and maintaining fiber optic cable infrastructure for high speed data services (broadband, LAN, gigabit ethernet, VoIP, xDSL and ATM), voice, video, and security information systems. Instructor must be RBT System-certified before students can receive certification.</p>	<ul style="list-style-type: none"> <li>• Complete an instructional unit consisting of an RBT Fiber Optic Network Cabling Certification module.</li> <li>• Pass an examination covering the following areas: fiber optic fundamentals, history of fiber optics, safety, fiber optic tools, fiber optic concepts, cable assemblies, cabling system design, cabling system installation, connecting methods and devices, connecting hardware and outlets, testing, troubleshooting, and standards.</li> </ul>	<p>RBT Systems, Inc.</p>	<p>Electricity 8533/8534/8535</p>
<p><b>Fiber Optics Installer Certification</b>            Entry-level certification for fiber optics installers. Program establishes and benchmarks the basic knowledge and skills needed to install fiber optics communications cabling safely and competently.</p>	<ul style="list-style-type: none"> <li>• Attend an ETA-approved Fiber Optics Installer School (or program).</li> <li>• Successfully complete a hands-on demonstration of splicing and connectorization ability as it applies to fiber optics cable.</li> <li>• Pass written FOIC certification examination.</li> </ul>	<p>Electronics Technicians Association, International (ETA)</p>	<p>Electricity 8533/8534/8535</p>
<p><b>Firefighter Level I Certification</b>            Certification of skills and knowledge obtained in an entry-level course for new firefighters</p>	<p>Pass an end-of-course examination certifying skills and knowledge learned in an entry-level course for new firefighters. Course is based on National Fire Protection Agency S1001 standard and consists of a combination of classroom study, fire-ground scenarios, and modular practical experiences that will prepare the firefighter to carry out most fire-ground functions under the direct supervision of an experienced firefighter.</p>	<p>Virginia Department of Fire Programs</p>	<p>Firefighting 8705/8706/8707</p>
<p><b>Floriculture-Greenhouse Assessment</b>            Occupational competency assessment of skills and knowledge related to instruction in floriculture-greenhouse operation</p>	<p>Pass the NOCTI knowledge-based exam (3949) consisting of 183 test items. Test includes basic floral design, intermediate floral design, advanced floral design, small business, greenhouse operations, plant sciences, and soil sciences.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Horticulture Sciences 8034</li> <li>• Floriculture 8038</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Food Production, Management, and Services Assessment</b> Occupational competency assessment of skills and knowledge related to basic culinary arts instruction</p>	<p>Pass the NOCTI knowledge-based exam (2036) consisting of 185 test items. Test includes recipes; large and small equipment; sanitation and safety; preparation of cold food, vegetables, starches and proteins, bakery, desserts, pastries, stocks, sauces, soups, meats, poultry, seafood, and breakfast; receiving and storage; nutritional values; customer service and management; and employment skills.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> <li>• Culinary Arts 8521/8522/8523</li> </ul>
<p><b>Forestry Products &amp; Processing Assessment</b> Occupational competency assessment of skills and knowledge covered in courses such as Introduction to Natural Resources and Forestry, Wildlife, and Soil Management</p>	<p>Pass the NOCTI knowledge-based exam (2037) consisting of 157 test items. Test includes general safety, logging/harvesting, tree identification, forest protection, silviculture, forest management, business management, wildlife, surveying, chain saw, sawmilling, diesel—hydraulics, employability skills, forest ecology, and timber cruising.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Introduction to Natural Resources 8040</li> <li>• Forestry, Wildlife, and Soil Management 8042</li> </ul>
<p><b>Fundamental Concepts of Business and Marketing Certificate</b> Certificate awarded for competency in business concepts and skills (marketing emphasis) based on business-derived standards and for knowledge of specific business/marketing functions (e.g., selling or industries such as retail or hospitality)</p>	<p>Pass a knowledge-based exam consisting of 100 multiple-choice test items. Test includes business administration, communications, distribution, economics, financing, marketing-information management, product management, professional development, promotion, and selling.</p>	<p>ASK Institute (DECA/MarkED)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Marketing 8120/8121</li> <li>• Adv. Marketing 8130/8131</li> <li>• Fashion Marketing 8140/8141</li> <li>• Adv. Fashion Marketing 8145/8146</li> <li>• Hotel/Motel Marketing 8160/8161</li> <li>• Adv. Hotel/Motel Marketing 8162/8163</li> <li>• International Marketing 8135</li> <li>• Adv. International Marketing 8136</li> <li>• Internet Marketing 8125</li> <li>• Marketing Management 8132</li> <li>• Sports, Entertainment, and Recreation Marketing 8175/8176</li> <li>• Adv. Sports, Entertainment and Recreation Marketing 8175</li> <li>• Travel/Tourism Marketing 8165/8166</li> <li>• Adv. Travel/Tourism Marketing 8167/8168</li> <li>• Financial Services Marketing 8180/8181</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Fundamentals of Wireless LANs Certificate</b> Certification of introductory skills and knowledge of wireless local area networks	Pass an on-line end-of-course exam for Cisco's sponsored course, Fundamentals of Wireless LANs. The exam focuses on the design, planning, implementation, operation, and troubleshooting of wireless networks.	Cisco Systems	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Systems Technology 8622/8623/8624</li> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<b>Gas Heat Certification</b> Indicates that a technician possesses an in-depth knowledge of all types of gas heat units and their control systems. Any technician who installs, services, or maintains gas heat systems should be certified. Electrical Certification is prerequisite to the Gas Heat exam.	Pass a written exam focusing on the following: types of furnaces, gas fuels (natural gas, LP gas), combustion, gas valve, automatic combination gas valve, manifold, orifice, burners, pilots, gas furnace wiring diagrams, and troubleshooting techniques.	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<b>General Drafting and Design Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in general drafting and design	Pass the NOCTI knowledge-based exam, General Drafting and Design (2038), consisting of 175 test items. Test includes basic drawing and dimensioning skills, job entry skills, geometric construction, applied mathematics, drawing techniques and supplementary view, dimensioning skills—computer-aided drafting (CAD), dimensioning skills—mechanical drafting, mechanical drafting and shop manufacturing processes, planning and performing architectural activities/terms/symbols, architectural floor plans, architectural elevations and sections, and supplemental drafting activities.	National Occupational Competency Testing Institute (NOCTI)	Drafting 8530/8531/8532
<b>Graphic Communications Technology Assessment</b> Occupational competency assessment of skills and knowledge covered in an instructional program for graphics arts, printing, and related digital media	Pass the NOCTI knowledge-based exam (4042) consisting of 190 test items. Test includes introduction to printing, electronic imaging and copy presentation, image assembly and platemaking, duplicator/press operations, finishing processes, and electronic publishing.	National Occupational Competency Testing Institute (NOCTI)	Graphic Imaging Technology 8660/8661/8662
<b>Graymark Cable Installation Certification</b> Certification provided to students who have successfully trained on the Graymark Cabling Tech program as taught by a certified instructor. The Cabling Tech program covers all topics required by the industry standard BICSI Level 1 certification plus cable installation such as phone, cable television, and inside and outside installation cable.	<ul style="list-style-type: none"> <li>• Complete the Graymark Cabling Tech program taught by a teacher certified to teach that curriculum.</li> <li>• Pass an exit exam related to the Graymark Cabling Tech program competencies.</li> </ul>	Graymark International	Electricity 8533/8534/8535

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Greenhouse Operators Certification Program</b> Certification of skills and knowledge relating to greenhouse production and marketing	Pass a knowledge-based exam based on curriculum provided by the Virginia Flower Growers Association for greenhouse operations.	Southeast Greenhouse Growers Association/Virginia Flower Growers Association	Choose one of the following: <ul style="list-style-type: none"> <li>• Horticulture Sciences 8134</li> <li>• Floral Design I 8055</li> <li>• Floral Design II 8056</li> <li>• Floriculture II 8038</li> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Specialty Horticulture Arts 8037</li> </ul>
<b>Heating, Electrical, Air Conditioning Technology (HEAT) Examination</b> A combined assessment covering heating, electrical, and air conditioning technology. This examination is designed specifically for secondary HVAC programs.	Pass a "student outcome assessment" (HEAT) examination designed for secondary HVAC programs* This 100 question examination includes equipment installation and service; knowledge of electric heat systems and components; knowledge of heating system and components; safety, theory and application; troubleshooting and problem solving. *There are two versions of the HEAT assessment, one with questions covering gas heat, and the other with questions on oil heat.	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<b>Health Assisting Assessment</b> Occupational competency assessment of skills and knowledge covered in basic health assisting instruction	Pass the NOCTI knowledge-based exam (2044) consisting of 123 test items. Test includes medical terminology, observation and communication, employment skills, and health assisting skills.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Health Assistant II 8332</li> <li>• Nurse Aide II 8360/8362</li> <li>• Practical Nursing II 8358</li> </ul>
<b>Heat Pump Certification</b> Certification of competence in all areas of service and troubleshooting air-to-air heat pump systems. Any technician responsible for the installation, service and maintenance of air-to-air heat pump systems should be Heat Pump Certified. Electrical and Air Conditioning Certifications are prerequisites for this test.	Pass a written exam focusing on the following: theory, operation and components of a reverse cycle heat pump, four-way valves, heat sources for heat pumps, auxiliary heat for heat pumps, heat pump efficiency ratings, co-efficiency of performance, control sequences, maintenance procedures, and safety.	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<b>Home Health Aide Assessment</b> Occupational competency assessment of skills and knowledge covered in home health aide instruction	Pass the NOCTI knowledge-based exam (2048) consisting of 131 test items. Test includes first aid, abbreviations, vocabulary and communication, employability skills, client care/medications, safety, nutrition and elimination, positioning, client transfer, personal care, home maintenance management, and client rights.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Health Assistant II 8332</li> <li>• Nurse Aide II 8360/8362</li> <li>• Practical Nursing II 8358</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Horticulture—Floriculture Assessment</b> Occupational competency assessment of skills and knowledge covered in basic floriculture instruction	Pass the NOCTI knowledge-based exam (2049) consisting of 135 test items. Test includes general knowledge, pest management, fundamentals of irrigation, basic nursery/greenhouse skills, horticulture retailing, greenhouse/floriculture, floral industry, and interiorscaping.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Horticulture Sciences 8034</li> <li>• Floriculture 8038</li> </ul>
<b>Horticulture—Landscaping Assessment</b> Occupational competency assessment of skills and knowledge covered in basic landscaping instruction	Pass the NOCTI knowledge-based exam (2149) consisting of 131 test items. Test includes general knowledge, pest management, fundamentals of irrigation, basic nursery/greenhouse skills, horticulture retail, landscape construction, landscape maintenance, golf course maintenance, and arboriculture.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Horticulture Sciences 8034</li> <li>• Landscaping 8036</li> </ul>
<b>Horticulture—Olericulture Assessment</b> Occupational competency assessment of skills and knowledge covered in basic greenhouse plant production and management as relates to fruits and vegetables	Pass the NOCTI knowledge-based exam (2249) consisting of 124 test items. Test includes general knowledge, pest management, fundamentals of irrigation, basic nursery/greenhouse skills, horticulture retailing, and fruits and vegetables.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Horticulture Sciences 8034</li> <li>• Greenhouse Plant Production and Management 8037</li> </ul>
<b>Hospitality Management—Food and Beverage Option Assessment</b> Occupational competency assessment of skills and knowledge related to hospitality industry management with emphasis on food and beverage operations	Pass the NOCTI knowledge-based exam (1079) consisting of 159 test items. Test includes introduction to hospitality management, guest relations/concierge, understanding hospitality marketing, the marketing department, marketing to organizations, safety on the job, cashier, travel and tourism, restaurant management, food and beverage service, and legal and ethical responsibilities.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Advanced Hotel/Motel Marketing 8162/8163</li> <li>• Hospitality Services I 8202</li> <li>• Hospitality Services II 8203</li> </ul>
<b>Hospitality Management—Lodging Option Assessment</b> Occupational competency assessment of skills and knowledge related to hospitality industry management with emphasis on lodging operations	Pass the NOCTI knowledge-based exam (1080) consisting of 163 test items. Test includes introduction to hospitality management, front office organization, rooms, bedding and rates, the reservation function, guest relations/concierge, understanding hospitality marketing, the marketing department, marketing to organizations, safety on the job, cashier, travel and tourism, and legal and ethical responsibilities.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Advanced Hotel/Motel Marketing 8162/8163</li> <li>• Hospitality Services I 8202</li> <li>• Hospitality Services II 8203</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>House Wiring: Residential Construction Academy Examination</b> Examination of skills and knowledge covered in the course materials, "Residential Construction Academy: House Wiring," Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures all areas of residential wiring that are required of an entry-level electrician. The examination covers the following: preparing and planning a residential wiring job; safety; hardware, materials, measurement instruments used; residential service entrances; electrical system rough-in; electrical box and enclosure installation; cable and raceway installation; switching and branch circuit installation; video, voice and data wiring installation; residential system trim-out; lighting fixture and device installation; service panel trim-out; maintaining, troubleshooting, and repairing residential electrical wiring systems.</p>	<p>Thomson Delmar Learning/ Home Builders Institute</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Electricity 8533/8534/8535</li> <li>• Building Trades 8515/8516/8517</li> </ul>
<p><b>HVAC: Residential Construction Academy Examination</b> Examination of skills and knowledge covered in the course materials, "Residential Construction Academy: HVAC," Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures the skills and knowledge necessary for the aspiring technician who will be involved in the installation, startup, and service of residential air conditioning and heating systems. The examination covers the following: introduction to matter, energy and heat basics; refrigeration process; installation safety; unit location and the air distribution system; system connections; system evacuation, startup and service; mechanical and electrical troubleshooting; refrigerant management; basic electricity motors and automatic controls; indoor air quality; electric, gas, oil, hydronic and geothermal heating.</p>	<p>Thomson Delmar Learning/ Home Builders Institute</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>
<p><b>HVAC, National Construction Career Test Certification</b> of knowledge and skills defined as Level 1 competency in the heating, ventilation, and air conditioning area. The certification exam will be based upon the NCCER <i>Content Learning Series</i> standardized curriculum.</p>	<p>Pass an exam that covers basic principles and skills related to the residential and light commercial heating and air conditioning systems.</p>	<p>National Center for Construction Education &amp; Research (NCCER)</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>
<p><b>IC<sup>3</sup> (Internet and Computing Core Certification)*</b> A global, validated, standards-based training and certification program for basic computing and Internet literacy. It validates the knowledge and skills required for basic use of computer hardware, software, networks, and the Internet.</p>	<p>Pass three individual examinations in the following areas:</p> <ul style="list-style-type: none"> <li>• Computing Fundamentals</li> <li>• Key Applications</li> <li>• Living On-line</li> </ul>	<p>Certiport</p>	<p>Choose any 36-week Business and Information Technology course except Keyboarding, Keyboarding Applications, Digital Input Technologies, or Notetaking.</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>iNet+ Certification*</b> Certification of essential networking and Internet knowledge and skills of entry-level Internet and e-commerce technical professionals who are responsible for participating in the maintenance of Internet, Intranet, and Extranet infrastructure and services as well as the development of Web-based applications	Pass a written exam that requires knowledge in six domain areas: Internet Basics & Clients, Development, Networking, Internet Security, and Business Concepts.	CompTIA	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>
<b>Industrial Maintenance Mechanic Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in industrial maintenance technology	Pass the NOCTI knowledge-based exam, Industrial Maintenance Mechanic Assessment (1074), consisting of 146 test items. Test includes digital fundamentals, hydraulics/pneumatics, motor controls/mechanism drives, programmable controls, and industrial robotics systems.	National Occupational Competency Testing Institute (NOCTI)	Industrial Maintenance Technology 8575/8576/8577
<b>Installer Core Certification (HVAC-NATE)</b> The Core NATE Installer exam is the first certification required before a technician chooses a more advanced specialty installation exam for full certification (passing of core exam and specialty area exam)	Pass a 50-question core exam that covers safety, tools, soft skills, principles of heat transfer and total comfort, and electrical questions.	North American Technician Excellence, Inc. (NATE)	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<b>International Computer Driving License (ICDL)*</b> Computer literacy certification stressing proficiency in seven broad areas	Pass individual examinations in the following seven areas: <ul style="list-style-type: none"> <li>• Basic Concepts of IT</li> <li>• Using a Computer and Managing Files</li> <li>• Word Processing</li> <li>• Spreadsheets</li> <li>• Databases</li> <li>• Presentations</li> <li>• Information and Communication</li> </ul>	ICDL US	Choose any 36-week Business and Information Technology course except Keyboarding, Keyboarding Applications, Digital Input Technologies, or Notetaking.

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>IT Essentials Certificate, Level 1</b> End-of-course certificate awarded upon successful completion of the curriculum unit, IT Essentials Level 1: PC Hardware and Software, from Cisco Systems. It provides stepping-stone preparation to the A+ certification from CompTIA.</p>	<p>Pass one examination covering the following topics: information technology basics, how computers work, assembling a computer, operating systems fundamentals, Windows 9x operating systems, multimedia capabilities, Windows NT/2000/XP operating systems, advanced hardware fundamentals for servers, networking fundamentals, printers and printing, preventive maintenance, troubleshooting PC hardware, and troubleshooting software.</p>	<p>Cisco Systems</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Control and Automation 8421</li> <li>• Information Technology Fundamentals 6670</li> <li>• Information Technology in Production Systems 8496</li> <li>• Computer Systems Technology 8622/8623/8624</li> </ul>
<p><b>IT Essentials Certificate, Level 2</b> End-of-course certificate awarded upon successful completion of the curriculum unit, IT Essentials Level 2: Network Operating Systems, from Cisco Systems. It provides a stepping-stone to the certifications such as Network+, Server+, and Linux+ from CompTIA.</p>	<p>Pass one examination covering the following topics: operating system fundamentals, introduction to networking, physical components of a network, TCP/IP networking, overview of network services, introduction to network operating systems, installation and boot process overview, Windows 2000 Professional, Linux installation procedures, Linux, advanced NOS administration, installing and maintaining hardware in a Linux environment, troubleshooting the operating system, and network security.</p>	<p>Cisco Systems</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Computer Networking Hardware Operations IV 8545</li> </ul>
<p><b>Java Programming Certificate</b> End-of-course certificate awarded upon successful completion of the course, Fundamentals of Java Programming, from Cisco Systems. It provides a steppingstone to the Sun Certified Programmer for Java certification.</p>	<p>Pass an end-of-course online exam which tests the following: conceptual understanding of object oriented programming, Java languages, object-oriented technologies to solve business problems, language fundamentals and Java language API, and creating classes, objects, and applications.</p>	<p>Cisco Systems</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Advanced Database Design and Management 6661</li> <li>• Advanced Programming 6641</li> </ul>
<p><b>Light Commercial Heating &amp; Air Conditioning</b> Industry Competency Exam (ICE) offered by ARI. It measures industry-wide standards of basic competency for entry-level (one year or less) technicians in the area of light commercial heating and air conditioning (6- to 20-ton systems).</p>	<p>Pass an exam that contains 100 multiple-choice questions covering the ARI curriculum guide for Light Commercial Heating &amp; Air Conditioning.</p>	<p>Air Conditioning and Refrigeration Institute (ARI)</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Linux+ Certification Program</b> Benchmark of basic knowledge and skills pertaining to the Linux computer operating system	Pass an examination consisting of approximately 95 multiple-choice questions, which tests basic knowledge of the work environment and typical job tasks and problems encountered by an entry-level Linux professional.	CompTIA	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<b>Lodging Management Program Certification, Level 1</b> Certification indicating that student has studied and experienced career opportunities in the lodging and food service industry, has developed skills needed in the operation of a lodging property, and has passed the Level 1 exam	Pass an exam after completing Level 1 of the AH&LA Lodging Management Program. Exam items include overview of lodging management, the front office, and housekeeping.	American Hotel and Lodging Association (AH&LA)	Choose one of the following: <ul style="list-style-type: none"> <li>• Hotel/Motel Marketing 8160/8161</li> <li>• Hospitality Services I 8202</li> </ul>
<b>Lodging Management Program Certification, Level 2</b> Certification indicating that student has studied and experienced career opportunities in the lodging and food service industry, has developed skills needed in the operation of a lodging property, and has passed the Level 2 exam	Pass an exam after completing Level 2 of the AH&LA Lodging Management Program. Exam items include leadership and management, marketing and sales, food and beverage service.	American Hotel and Lodging Association (AH&LA)	Choose one of the following: <ul style="list-style-type: none"> <li>• Advanced Hotel/Motel Marketing 8162/8163</li> <li>• Hospitality Services II 8203</li> </ul>
<b>Machining Skills—Level 1</b> Certification of essential knowledge and skills for entry-level machinists in any one of seven distinct Machining Level 1 skill areas	Each of seven credentials that can be earned requires successful completion of a performance requirement and a related theory exam. Each credential involves a different written exam with the exception of Turning; the Turning exam needs to be taken only once for both Turning credentials. In summary, there are seven performance requirements and six written exams at Machining Level I	National Institute for Metalworking Skills, Inc. (NIMS)	Precision Machining Technology 8539/8540/8541
<b>Macromedia Certified Professional</b> Certification of knowledge and skill in a specific Macromedia software product. Macromedia-certified developers and designers are considered the elite of Web developers. This certification program is generally considered an advanced level industry certification. Individual assessments are available in the following areas: Certified Macromedia Flash Designer, Certified ColdFusion Developer, Certified Macromedia Flash Developer, Certified Dreamweaver Developer.	Pass an exam that demonstrates proficiency in one of the following Macromedia software products: Dreamweaver MX Certification exam (65 multiple-choice questions/70-minute closed book), Certified Macromedia Flash MX Designer (67 multiple-choice questions/70-minute closed book), Certified Macromedia Flash MX Developer (65 multiple-choice questions/70-minute closed book), and Certified ColdFusion Developer (65 multiple-choice questions/70-minute closed book).	Macromedia	Choose one of the following: <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Manufacturing Technology Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in manufacturing technology</p>	<p>Pass the NOCTI knowledge-based exam, Manufacturing Technology (1084), consisting of 175 items. Test includes math, science, measurement, communication skills, workplace safety, health and job skills, quality assurance (maintenance), blueprint reading, manufacturing fundamentals, processes and materials, planning and scheduling, production processing, material utilization, computer use, process control and improvement, time motion and costs, purchasing and resource identification activities, computer control functions, PLCs and automated manufacturing, communication processes, electrical/electromechanical fluid components, and design processes.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Manufacturing Systems 8425/8426</li> <li>• Advanced Manufacturing Systems 8427</li> </ul>
<p><b>Masonry, National Construction Career Test</b> Certification of knowledge and skills defined as Level 1 competency in the masonry trade area. The certification exam is based upon the NCCER <i>Content Learning Series</i> standardized curriculum.</p>	<p>Pass an exam that covers the following: introduction to masonry, safety requirements, tools and equipment; mathematics, drawings and specifications; mortar, masonry units, and installation techniques.</p>	<p>National Center for Construction Education &amp; Research (NCCER)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Masonry 8512/8513/8514</li> </ul>
<p><b>Master CIW Administrator***</b> Certification for Web professionals who manage, develop security for, and tune corporate Internet and intranet infrastructure; monitor Web, FTP, news and mail servers; and configure and deploy e-business solutions servers</p>	<p>Pass a series of three knowledge-based exams (based on specific course material) to complete the Master CIW Administrator Certification Track.</p> <ul style="list-style-type: none"> <li>• Server Administrator</li> <li>• Internetworking Professional</li> <li>• Security Professional</li> </ul>	<p>Prosoft Learning Corporation</p>	<p>Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.</p>
<p><b>Master CIW Designer***</b> Certification for Web professionals who implement and maintain hypertext-based Web sites using authoring and scripting languages, create Web content, use Web management and digital media tools, and apply human-factor principles to design</p>	<p>Pass a series of two knowledge-based exams to complete the Master CIW Designer Certification Track:</p> <ul style="list-style-type: none"> <li>• Site Designer</li> <li>• E-Commerce Designer</li> </ul>	<p>Prosoft Learning Corporation</p>	<p>Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.</p> <p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Master CIW Enterprise Developer***</b> A certification series that denotes high-level skills in the design, development, and administration of enterprise-level Web sites with sophisticated database connectivity	Pass a series of six knowledge-based exams to complete the Master CIW Enterprise Developer Track: <ul style="list-style-type: none"> <li>• Web Languages</li> <li>• Application Developer</li> <li>• Java Programming</li> <li>• Object-Oriented Analysis &amp; Design</li> <li>• Database Specialist</li> <li>• Enterprise Specialist</li> </ul>	Prosoft Learning Corporation	Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.
<b>Master CIW Web Site Manager***</b> A certification for Web professionals who will develop and manage Web sites and services for small- to medium-sized businesses that do not typically employ large IT staffs	Pass a series of three knowledge-based exams to complete the Master CIW Web Site Manager Certification Track: <ul style="list-style-type: none"> <li>• Server Administrator</li> <li>• Web Languages</li> <li>• Site Designer</li> </ul>	Prosoft Learning Corporation	Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.
<b>Medical Assisting Assessment</b> Occupational competency assessment of skills and knowledge covered in a medical assisting instructional program.	Pass the NOCTI knowledge-based exam (3055) consisting of 198 test items. Test includes general office procedures, general laboratory procedures and diagnostics, clinical procedures, patient instruction and foundations of healthcare.	National Occupational Competency Testing Institute (NOCTI)	Medical Assistant II 8346
<b>Metalworking and Fabrication Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in metalworking and fabrication	Pass the NOCTI knowledge-based exam, Metalworking and Fabrication 2056, which includes 160 test items. Test includes benchwork and layout, lathes, sawing, milling, drilling, grinding, related theory, welding terms and symbols, shielded metal arc welding, oxyacetylene welding, gas tungsten arc welding, and gas metal arc welding.	National Occupational Competency Testing Institute (NOCTI)	Sheet Metal 8663/8664/8665
<b>Microsoft Certified Applications Developer (MCAD)**</b> Credential for professionals who develop and maintain department-level applications, components, Web or desktop clients, or back office services.	Pass two core exams: <ul style="list-style-type: none"> <li>• One exam must focus on either Application Development or Windows Application Development in an area of choice.</li> <li>• Other exam focuses on core Web services and server components.</li> </ul> Also, pass one elective exam.	Microsoft	Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.
<b>Microsoft Certified Professional (any Microsoft Professional Certification exam)*</b> A measure of technical proficiency and expertise indicated by passing one of Microsoft's information technology industry certification exams, leading toward a more advanced Microsoft certification specialty program	Pass <u>one</u> current Microsoft information technology certification exam that provides a valid and reliable measure of technical proficiency and expertise (a current exam is any exam that has not been retired).	Microsoft	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Programming 6640</li> <li>• Advanced Programming 6641</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Microsoft Certified Systems Administrator (MCSA)***</b>            Credential related to skills required to implement, manage, and troubleshoot the ongoing needs of Microsoft Windows 2000--based operating environments, including Windows .Net Server.</p>	<p>Pass three core exams and one elective exam.</p> <ul style="list-style-type: none"> <li>Core exams include topics such as Installing, Configuring and Administering Microsoft Windows 2000 Professional (or Windows XP Professional)—Desktop, Server, and Network environment.</li> <li>ComTIA's A+ and Network+ or A+ and Server+ may be substituted for the required MCSA elective exam.</li> </ul>	<p>Microsoft</p>	<p>Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.</p>
<p><b>Microsoft Certified Systems Engineer (MCSE)***</b>            Certification of knowledge and skills for information technology professionals who plan, implement, and/or support business solutions using Microsoft Windows Operating Systems and BackOffice applications software</p>	<p>MCSE candidates on the Microsoft Windows 2000 Track are required to pass five core exams and two elective exams.</p>	<p>Microsoft</p>	<p>Instructional competencies and materials obtained from specific vendors may be used to prepare students for this certification. The course should be reported as Advanced Information Technology I 6680 or Advanced Information Technology II 6681.</p>
<p><b>Microsoft Office Specialist (MOS)*</b>            A globally recognized standard for demonstrating desktop skills with the Microsoft Office Specialist suite of business productivity applications. Office Suite versions include the Office 2000, XP, and 2003. Certifications are available in specific MOS versions at several levels: specialist (core) or expert levels</p>	<p>Pass any <u>one</u> unique Microsoft Office Specialist exams at the specialist <u>or</u> expert levels (a minimum of <u>one</u> unique exam is required for student-selected verified credit eligibility).</p>	<p>Microsoft</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>Computer Applications 6611</li> <li>Computer Information Systems 6612</li> <li>Advanced Computer Information Systems 6613</li> <li>Computer Network Software Operations 6650</li> <li>Advanced Computer Network Software Operations 6651</li> <li>Database Design and Management 6660</li> <li>Advanced Database Design and Management 6661</li> <li>Design, Multimedia, and Web Technologies 6630</li> <li>Advanced Design, Multimedia, and Web Technologies 6631</li> <li>Digital Input Technologies 6161</li> <li>Information Technology Fundamentals 6670</li> <li>International Baccalaureate Information Technology in a Global Society IB6613</li> <li>Keyboarding Applications 6152</li> <li>Legal Systems Administration 6735</li> <li>Medical Systems Administration 6730</li> <li>Office Administration 66216622</li> <li>Office Specialist 6640/6641/6642</li> <li>Word Processing 6625</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Nail Technician</b> Virginia state license to practice nail care</p>	<ul style="list-style-type: none"> <li>• Complete the training required by the licensing board as defined in the Code of Virginia.</li> <li>• Pass the written and performance elements of a Virginia licensing examination.</li> </ul>	<p>Virginia Board for Barbers and Cosmetology (Department of Professional &amp; Occupational Regulations)</p>	<p>Nail Technician 8692/8693</p>
<p><b>National Automotive Technicians Education Foundation (NATEF) End of Program Test Series Examinations</b> Assessment of specialty skill areas in automobile service and repair. Individual examinations are considered to be “pathway” examinations potentially leading to ASE industry certification in a specialty area.</p>	<p>Pass at least <u>two</u> of eight specialty exams in the following areas: engine repair, automatic transmission and transaxle, manual drive train and axles, suspension and steering, brakes, electrical and electronic systems, heating and air conditioning, or engine performance. Verified credit will be awarded for the passing of two specialty examinations.</p>	<p>National Automotive Technician Education Foundation (NATEF)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Automotive Technology—Certified 8506/8507/8508</li> <li>• Automotive Servicing—Non-Certified 8710/8711/8712</li> </ul>
<p><b>National Health Care Foundation Skill Standards Assessment</b> This assessment is based on recognized foundational industry standards for the national health science career cluster.</p>	<p>Individuals must be considered eligible to take the assessment after successful completion of certain specified portfolio criteria as determined by the local instructor. The following National Health Care Foundation Skill Standards will be included on the assessment: communications, systems, employability skills, legal responsibilities, ethics, safety practices, teamwork, and health maintenance practices.</p>	<p>National Consortium on Health Science and Technology Education (exam administered by National Occupational Competency Testing Institute)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Health Assistant II 8332</li> <li>• Nursing Assistant II 8360/8362</li> <li>• Practical Nursing II 8358</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>National Professional Certification in Customer Service</b>            Certification that documents knowledge and skills in the industry-identified area of Customer Service Skill Standards.</p>	<p>Pass an Internet-delivered, knowledge-based exam made up of real-life customer service situations, some presented through video and audio, with questions presenting possible courses of action.</p>	<p>National Retail Federation Foundation</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Marketing 8120/8121</li> <li>• Advanced Marketing 8130/8131</li> <li>• Fashion Marketing 8140/8141</li> <li>• Advanced Fashion Marketing 8145/8146</li> <li>• Hotel/Motel Marketing 8160/8161</li> <li>• Advanced Hotel/Motel Marketing 8162/8163</li> <li>• Global Marketing and Commerce 8135</li> <li>• Advanced Global Marketing and Commerce 8136</li> <li>• Marketing Management 8132</li> <li>• Internet Marketing 8125</li> <li>• Sports, Entertainment, and Recreation Marketing 8175/8176</li> <li>• Advanced Sports, Entertainment, and Recreation Marketing 8177/8178</li> <li>• Travel and Tourism Marketing 8165/8166</li> <li>• Advanced Travel and Tourism Marketing 8167/8168</li> <li>• Financial Services Marketing 8180/8181</li> <li>• EFE Cooperative Education 9020/9030/9021/9031</li> </ul>
<p><b>Network+ Certification**</b>            Certification that candidates have knowledge of the layers of the OSI model, can describe the features and functions of network components and have skills needed to install, configure, and troubleshoot basic networking hardware peripherals and protocols.</p>	<p>Pass a written exam requiring knowledge of networking technology and networking application practices.</p>	<p>CompTIA</p>	<p>Advanced Computer Network Software Operations 6651</p>
<p><b>NRDA Certification (Dental Assisting)</b>            One of several certifications in the health sciences field offered by the National Association for Health Professionals.</p>	<ul style="list-style-type: none"> <li>• Complete a state-approved dental assisting program.</li> <li>• Pass a knowledge-based examination pertaining to common requirements and job functions of a dental assistant.</li> </ul>	<p>National Allied Health Registry/ National Association for Health Professionals</p>	<p>Dental Assistant 8329</p>
<p><b>NRDA Certification (Medical Assisting)</b>            One of several certifications in the health sciences field offered by the National Association for Health Professionals</p>	<ul style="list-style-type: none"> <li>• Complete a state-approved medical assisting program.</li> <li>• Pass a knowledge-based examination pertaining to common requirements and job functions of a medical assistant.</li> <li>•</li> </ul>	<p>National Allied Health Registry/ National Association for Health Professionals</p>	<p>Medical Assistant 8346</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Nurse Aide</b> Certification for individuals who perform patient care in support of registered professional nurses and other health care personnel	<ul style="list-style-type: none"> <li>Complete an approved nurse aide program.</li> <li>Pass a practical and written test focusing on basic emergency procedures, vital signs, intake and output, bathing and oral hygiene, care of the skin, communication and interpersonal skills, infection control, patients' rights, restorative therapy, and the unique needs and behaviors of the cognitively impaired patient.</li> </ul>	Virginia Board of Nursing	Choose one of the following: <ul style="list-style-type: none"> <li>Health Assistant II 8332</li> <li>Nursing Assistant II 8360/8362</li> <li>Practical Nursing II 8358</li> </ul>
<b>Nursing Assisting Assessment</b> Occupational competency assessment of skills and knowledge covered in nursing assisting instruction	Pass the NOCTI knowledge-based exam (3058) consisting of 116 test items. Test includes basic nursing skills, personal care services, mental health and social service needs, client rights, employability skills, and basic restorative devices.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>Health Assistant II 8332</li> <li>Nursing Assistant II 8360/8362</li> <li>Practical Nursing II 8358</li> </ul>
<b>Oil Heat Certification</b> Technicians responsible for service or maintenance of oil heating systems should be certified in this area. Oil heat requires more consistent regular service than any other heat system. Electrical Certification is prerequisite to the Oil Heat exam.	Pass a written exam focusing on the following: fuel oils, combustion products and byproducts, combustion efficiency, gun-type oil burners, nozzles, fuel oil pumps, oil burner components, ignition system, basic service procedures, and preventative maintenance.	HVAC Excellence	Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505
<b>Oracle Certification Program Examinations*</b> A measure of technical proficiency and expertise indicated by passing one of the Oracle industry certification exams, leading toward a more advanced Oracle certification specialty program	Pass <u>one</u> current Oracle professional certification exam that provides a valid and reliable measure of technical proficiency and expertise in Oracle database design, development, operation, and maintenance. (A current exam is any that has not been retired.)	Oracle Corporation	Choose one of the following: <ul style="list-style-type: none"> <li>Database Design and Management 6660</li> <li>Advanced Database Design and Management (Oracle Academy) 6661</li> </ul>
<b>Outdoor Power Equipment Certifications</b> A certification program that includes six tests (each one a certification), ranging from small outdoor power engines to compact diesel engines and generators	Pass any <u>one</u> of the following tests: 2-stroke engine, 4-stroke engine, electrical, drivelines, compact diesel, or generator to receive one of six Outdoor Power Equipment certifications.	Equipment and Engine Training Council (EETC)	Choose one of the following: <ul style="list-style-type: none"> <li>Introduction to Power, Structural, and Technical Systems 8016</li> <li>Small Engine Repair 8082</li> <li>Small Engine Technology 8725/8726/8727</li> </ul>
<b>Parts Specialist—Automotive or Medium/Heavy Truck (ASE)</b> Certification of knowledge, skills, and professionalism of parts specialists	ASE tests and issues a certification for each of the following three areas: medium/heavy truck parts specialist, automobile parts specialist, and medium/heavy truck aftermarket parts specialist.	National Institute for Automotive Service Excellence	Choose one of the following <ul style="list-style-type: none"> <li>Automotive Technology—Certified 8506/8507/8508</li> <li>Automotive Servicing—Non-Certified 8610/8711/8712</li> </ul>

Credential Title/Description	How to Earn It	Provider	Possible Preparatory Courses
<p><b>Plumbing: Residential Construction Academy Examination</b> Examination of skills and knowledge covered in the course materials, “Residential Construction Academy: Plumbing,” Thomson Delmar Learning in Partnership with the Home Builders Institute</p>	<p>Pass an online assessment that measures all areas of residential plumbing installations. The examination covers the following: materials, hand and power tools; pipe, fittings, valves and devices; fixtures and equipment; faucets and drain assemblies; equipment layout and installation; water distribution and installation; installation of waste drainage and vent systems; fixture and equipment installation; troubleshooting and plumbing repairs; and troubleshooting hydronic heating systems.</p>	<p>Thomson Delmar Learning/Home Builders Institute</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Plumbing 8551/8552/8553</li> </ul>
<p><b>Plumbing Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in the plumbing trade</p>	<p>Pass an exam that covers the following: introduction to the plumbing trade; plumbing tools; introduction to plumbing math; introduction to plumbing drawings; plastic pipe and fittings; copper pipe and fittings; cast-iron pipe and fittings; carbon steel pipe and fittings; fixtures and faucets; introduction to drain, waste, and vent (DWV) systems; and introduction to water distribution systems.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Building Trades 8515/8516/8517</li> <li>• Plumbing 8551/8552/8553</li> </ul>
<p><b>Pre-Engineering/Engineering Technology Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level pre-engineering program</p>	<p>Pass the NOCTI knowledge-based exam, Pre-Engineering/Engineering Technology (1475), with 179 test items. Test includes an overview of engineering, design process/problem solving, manufacturing, materials, communication and teamwork, safety, and engineering systems.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Introduction to Engineering 8490</li> <li>• Advanced Engineering 8491</li> <li>• Principles of Engineering 8441</li> <li>• Introduction to Engineering Design 8439</li> <li>• Digital Electronics 8440</li> </ul>
<p><b>Precision Machining</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in precision machining</p>	<p>Pass the NOCTI knowledge-based exam, Precision Machining (2052), with 173 test items. Test includes organization and shop practices, measurement and inspection, shop math, interpretation of blueprints, design activities, benchwork, precision grinding machines, lathes, power saws, milling, cutting tool technology, drill presses, electro-discharge machines (EDM), computer numerical control (CNC), machine maintenance, metallurgical processes and heat treating, and application of technical information.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Precision Machining Technology 8539/8540/8541</p>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>PrintED Certification (All Exams)</b> A certification program that validates competencies related to PrintED, the industry's national accreditation program for secondary and postsecondary graphic communications programs. The program currently includes three exams, with a certificate being awarded for each area.</p>	<ul style="list-style-type: none"> <li>• Complete an instructional program that has achieved the national PrintED accreditation.</li> <li>• Pass one exam (either Introduction to Graphic Communications, Press Operations, or Digital File Preparation) that validates competencies related to the PrintED industry-based curriculum for the graphics communications industry.</li> </ul>	Graphic Arts Education and Research Foundation	Graphic Imaging Technology 8660/8661/8662
<p><b>Production Agriculture Assessment</b> Occupational competency assessment of skills and knowledge covered in typical Agricultural Production Technology and/or Management courses</p>	Pass the NOCTI knowledge-based exam (1063) consisting of 164 test items. Test includes animal science, plant science, agriculture mechanics, farm management, record keeping, leadership, and employability.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Agricultural Production Technology 8010</li> <li>• Agricultural Production Management 8012</li> </ul>
<p><b>ProStart Program Certification (Levels 1 and/or 2)</b> End-of-course examination for individuals who prepare for careers in the restaurant and food service industry. Indicated successful completion of either year 1 or 2 of the ProStart sponsored curriculum.</p>	<ul style="list-style-type: none"> <li>• Complete Year 1 or 2 of the industry-based ProStart sponsored culinary curriculum.</li> <li>• Pass the end-of-year ProStart program examination.</li> </ul>	Education Foundation of the National Restaurant Association	Choose one of the following: <ul style="list-style-type: none"> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> <li>• Culinary Arts 8521/8522/8523</li> </ul>
<p><b>Real Estate Salesperson</b> Virginia state license to handle purchases and sales of real estate</p>	<ul style="list-style-type: none"> <li>• Complete the training required by the licensing board as defined in the Code of Virginia.</li> <li>• Pass the written and performance elements of a Virginia licensing examination.</li> </ul>	Virginia Real Estate Board (Department of Professional & Occupational Regulations)	Real Estate Marketing 8191
<p><b>Refinishing Technology Assessment</b> Occupational competency assessment of skills and knowledge covered in typical secondary Automotive Body Technology and/or Repair programs</p>	Pass the NOCTI knowledge-based exam, Refinishing Technology Assessment (1075), consisting of 196 test items. Test includes refinishing, detailing, corrosion and safety/environmental.	National Occupational Competency Testing Institute (NOCTI)	Choose one of the following: <ul style="list-style-type: none"> <li>• Automotive Body Technology—Certified 8676/8677/8678</li> <li>• Auto Body Repair—Non-Certified 8679/8680/8681</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>Residential Air Conditioning and Heating Certification (ARI)</b>            Certification offered by ARI and referred to as one of its Industry Competency Exams (ICE). It measures industry-agreed standards of basic competency for entry-level (one-year experience or less) technicians in the area of Residential Air Conditioning and Heating (equipment consists of 5-ton systems or smaller).</p>	<p>Pass an exam that contains 100 multiple-choice questions covering the ARI curriculum guide for Residential Air Conditioning and Heating.</p>	<p>Air Conditioning and Refrigeration Institute</p>	<p>Heating, Ventilation, Air Conditioning, and Refrigeration 8503/8504/8505</p>
<p><b>Retail Commercial Baking Assessment</b>            Occupational competency assessment of skills and knowledge related to retail commercial baking normally included in a secondary level culinary arts program</p>	<p>Pass the NOCTI knowledge-based exam, Retail Commercial Baking (0259), consisting of 200 test items. Test includes general baking knowledge, weights, measures, general baking math, classifications and properties of ingredients, handling and storage of ingredients, safety and sanitation, production/scheduling/planning, yeast-raised dough products, doughnuts (cake and yeast-raised), cake decorating, cakes, laminated dough, cookies, pies and pastries, customer service, and merchandising of products.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Culinary Arts I 8275</li> <li>• Culinary Arts II 8276</li> <li>• Culinary Arts 8521/8522/8523</li> </ul>
<p><b>Retail Trades Assessment</b>            Occupational competency assessment of skills, functions, and knowledge foundations related to marketing and merchandising occupations</p>	<p>Pass the NOCTI knowledge-based exam (2053) consisting of 199 test items. Test includes advertising, electronic marketing, visual merchandise, entrepreneurship, economics, communication, selling, employability skills, related mathematics, marketing/merchandising and human relations/customer service.</p>	<p>National Occupational Competency Testing Institute (NOCTI)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Advanced Marketing 8130/8131</li> <li>• Advanced Fashion Marketing 8145/8146</li> <li>• Advanced Global Marketing and Commerce 8136</li> </ul>
<p><b>SENSE Training Program Certifications (Welding)</b>            Certification of knowledge and skills in welding for Level 1—Entry-Level Welder</p>	<p>To earn an AWS SENSE Level I (entry-level welder):</p> <ul style="list-style-type: none"> <li>• Complete the prescribed SENSE training program offered through an AWS-approved participating organization (program).</li> <li>• Pass the required written and performance-based certification examinations.</li> </ul>	<p>American Welding Society</p>	<p>Welding 8672/8673/8674</p>
<p><b>START Certification</b>            End-of-course exam that certifies satisfactory completion of the START curriculum related to line level occupations (Guest Service, Rooms Division, Food and Beverage Division) in the hospitality industry</p>	<p>Pass an end-of-course exam that covers specific areas of the hospitality industry. These areas include hospitality orientation, guest services, rooms division, front desk, reservationist, PBX operator, guest room attendant, maintenance worker, laundry attendant, public service cleaner, bell services attendant, and food and beverage division (restaurant server, banquet services, and bus person).</p>	<p>American Hotel and Lodging Association (AH&amp;LA)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Hospitality Services I 8202</li> <li>• Hospitality Services II 8203</li> <li>• Hotel/Motel Marketing 8160/8161</li> <li>• Advanced Hotel/Motel Marketing 8162/8163</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Student Electronics Technician Certification (SET)</b> The SET certification program is designed for electronics students who have completed an electronics instructional program, but have not entered the work force. It certifies knowledge of basic electronics concepts and principles.	This exam is the student version of the journey-level certification exam (Certified Electronics Technician Associate—CTE). This multiple-choice exam covers basic electricity, electronics, math, AC & DC circuits, transistors, and basic troubleshooting skills.	Electronics Technicians Association, International (ETA)	Choose one of the following: <ul style="list-style-type: none"> <li>• Electronics Technology 8536/8537/8538</li> <li>• Electronics Systems I 8416/8417</li> <li>• Electronics Systems II 8412</li> <li>• Electronics Systems III 8413</li> </ul>
<b>Sun Certified Associate for Java 2 Platform*</b> This certification is for entry level Java programmers and students interested in pursuing a career application development or software project management using the Java 2 Platform, Standard Edition (J2SE) technology.	Pass the Sun Certified Associate for Java 2 Platform exam (CX-310-019).	Sun Microsystems	Choose one of the following: <ul style="list-style-type: none"> <li>• Advanced Database Design and Management 6661</li> <li>• Advanced Programming 6641</li> </ul>
<b>Television Broadcasting Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in television broadcasting	Pass the NOCTI knowledge-based exam, Television Broadcasting (1427), consisting of 136 test items. Test includes pre-production, production, and post-production.	National Occupational Competency Testing Institute (NOCTI)	Television Production 8688/8689/8690
<b>Telecommunications Electronics Technician Certification</b> Certification of skills and knowledge related to telecommunications and electronics technicians	Pass an examination that measures knowledge of cables and cabling, analog telephony, equipment, telecom safety, transmission service, distribution methods, computer, digital telephony, interfacing, Internet, network infrastructures and topologies, office wiring, test equipment, troubleshooting, transmission protocols, mathematics, optical wiring, and wireless telephony.	Electronics Technicians Association, International (ETA)	Choose one of the following: <ul style="list-style-type: none"> <li>• Electronics Technology 8536/8537/8538</li> <li>• Telecommunications I 8650</li> <li>• Telecommunications II 8651</li> </ul>
<b>UNIX Certificate*</b> End-of-course certificate awarded upon successful completion of the course Fundamentals of UNIX. It provides a steppingstone to various Sun Systems Administrator certifications and the Linux+ certification from CompTIA.	Pass an end-of-course on-line exam which includes the following: how to use UNIX operating system commands, basic Sun Microsystems' Solaris operating environment commands, introduction to the Common Desktop Environment (CDE), and fundamental command-line features of the Solaris environment (file system navigation, file permissions, the vi text editor, command shells and basic network use).	Cisco Systems	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> </ul>
<b>Virginia Pharmacy Technician Certificate</b> Certification of basic skills and knowledge to begin work as a Pharmacy Technician	<ul style="list-style-type: none"> <li>• Complete the training as defined in the Code of Virginia.</li> <li>• Pass the Virginia Pharmacy Technician Examination.</li> </ul>	Virginia Board of Pharmacy	<ul style="list-style-type: none"> <li>• Pharmacy Technician I 8305</li> <li>• Pharmacy Technician II 8306</li> </ul>
<b>Visual Communications Assessment</b> Occupational competency assessment of skills and knowledge covered in a secondary level program that includes instruction in visual communications	Pass the NOCTI knowledge-based exam, Visual Communications Assessment (1425), consisting of 163 test items. Test includes visual literacy, conceptual design, color theory, typography, materials and tools, processes and procedures, and occupational overview.	National Occupational Competency Testing Institute (NOCTI)	Television Production 8688/8689/8690

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<b>Voice and Data Cabling Certification</b> End-of-course certificate awarded upon successful completion of the course Fundamentals of Voice and Data Cabling. It provides stepping stone preparation to the BICSI Registered Installer, Level I, certification exam.	Pass one end-of-course examination covering the following areas: cabling issues related to data and voice connections; industry and worldwide standards; types of media and cabling; physical and logical networks; signal transmission; documentation, design, and installation issues; and safety issues.	Cisco Systems	Choose one of the following: <ul style="list-style-type: none"> <li>• Computer Network Software Operations 6650</li> <li>• Advanced Computer Network Software Operations 6651</li> <li>• Electricity 8533/8534/8535</li> </ul>
<b>Web Design Certificate*</b> End-of-course certificate awarded upon successful completion of the course Fundamentals of Web Design. It provides a stepping stone to various product certifications in the Adobe Expert program as well as Web design and/or digital media assessments from Brainbench.	Pass an end-of-course on-line exam that tests the following: Web site production processes; design elements involving layouts, navigation, and interactivity; and Web design exercises using Adobe applications. Web design applications are taught and tested using Adobe Photoshop, Adobe Illustrator, Adobe GoLive, Adobe LiveMotion, and Adobe Premiere.	Cisco Systems	Choose one of the following: <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>
<b>Welding</b> Occupational competency assessment of skills and knowledge covered in a secondary level program in welding	Pass the NOCTI knowledge-based exam, Welding (2072), consisting of 191 test items. Test includes thermal cutting processes, basic heat treat/metallurgy/distortion control, welding terms/symbols/blueprint reading, weld inspection, knowledge of welding consumables, safety, power source principles, oxyfuel welding and brazing, shielded metal arc welding, gas metal arc welding/flux cored arc welding, basic knowledge of measuring instruments, welding qualifications and procedures, and welding costs.	National Occupational Competency Testing Institute (NOCTI)	Welding 8672/8673/8674
<b>Welding, National Construction Career Test</b> Certification of knowledge and skills defined as Level 1 competency in basic welding. The certification exam will be based upon the NCCER <i>Contren Learning Series</i> standardized curriculum.	Pass an exam that focuses on welding principles as contained in the <i>Contren Learning Series</i> curriculum, Welding Level One/AWS Entry Level Welder. The curriculum complies with the American Welding Society's "Schools Excelling through National Skills Standards Education" (SENSE) program.	National Center for Construction Education & Research (NCCER)	Welding 8672/8673/8674
<b>WOW Certified Apprentice Webmaster (CAW)*</b> Certification examination that measures essential competencies for aspiring or practicing Webmasters. The intent is to certify individuals in a body of knowledge that is identified and accepted as the baseline or foundation for a Webmaster.	Pass a 70-question exam in 60 minutes that demonstrates knowledge of the following: Internet basics, HTML, Web graphics, Web multimedia, Web site design, Web site management, Web project management, Web marketing, Web accessibility, and basic legal issues.	World Organization of Webmasters	Choose one of the following: <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>

<b>Credential Title/Description</b>	<b>How to Earn It</b>	<b>Provider</b>	<b>Possible Preparatory Courses</b>
<p><b>WOW Certified Web Administrator Apprentice (CWAA)*</b>  Certification examination that measures fundamental competencies for aspiring or practicing Web administrators. The intent is to certify individuals in a body of knowledge that is identified and accepted as the baseline or foundation of any Web administrator.</p>	<p>Pass a 70-question exam in 60 minutes that demonstrates knowledge of the following: site administration and maintenance, networking basics, hardware and infrastructure, Web business management, and basic security issues.</p>	<p>World Organization of Webmasters</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>
<p><b>WOW Certified Web Designer Apprentice (CWDSA)*</b>  Certification examination that measures essential competencies for aspiring or practicing Web designers. The intent is to certify individuals in a body of knowledge that is identified and accepted as the baseline or foundation of a Web designer.</p>	<p>Pass a 70-question exam in 60 minutes that demonstrates knowledge of Internet basics, HTML and WYSIWYG editors, Web graphics, Web multimedia, Web site design, Web site management, and basic legal issues.</p>	<p>World Organization of Webmasters</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>
<p><b>WOW Certified Web Developer Apprentice (CWDVA)*</b>  Certification examination that measures fundamental competencies for aspiring or practicing Web developers. The intent is to certify individuals in a body of knowledge that is identified and accepted as the baseline or foundation of any Web developer.</p>	<p>Pass a 70-question exam in 60 minutes that demonstrates basic knowledge of programming, markup, scripting, dynamic Web site technologies, servers, networking, Web security, Web business management, legal issues, and Web accessibility.</p>	<p>World Organization of Webmasters</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Design, Multimedia, and Web Technologies 6630</li> <li>• Advanced Design, Multimedia, and Web Technologies 6631</li> </ul>





## **Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations 2006-2007**

### **Need an overview of Career Clusters?**

- Career Clusters and the Core of Knowledge and Skills
- The 16 Career Clusters
- Connections: Career Pathways and Occupations to CTE Courses





## Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations. Detailed information about the States' Career Clusters Initiative appears at <http://www.careerclusters.org>.

### Identification of Career Clusters

---

The 16 career Clusters are as follows:

- Agriculture, Food, and Natural Resources
- Architecture and Construction
- Arts, A/V Technology, and Communications
- Business, Management, and Administration
- Education and Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality and Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections, and Security
- Manufacturing
- Marketing, Sales, and Service
- Science, Technology, Engineering, and Mathematics
- Transportation, Distribution, and Logistics

### Career Clusters and Common Core of Knowledge and Skills

---

Each of the 16 career clusters has a common core of knowledge and skills required for career success in all the occupations included in the cluster. This core of knowledge and skills consists of the following elements, which may require different applications in different clusters. (For example, the academic foundations and technical skills needed in architecture and construction differ from those needed in health science.)

- Academic foundations
- Communication
- Problem solving and critical thinking
- Information technology
- Systems
- Safety, health, and environment
- Leadership and teamwork
- Ethics and legal responsibilities
- Employability and career development
- Technical skills

Students who are exploring careers need to investigate the core elements to gain a comprehensive picture of, for example, the ethical issues surrounding Hospitality and Tourism industries and the similarities and differences between them and the ethics of Finance or Human Services.

## Connection of Career Pathways and Occupations to CTE Courses

Each pathway within a cluster offers many occupations. Students may choose CTE and academic courses that will help them explore or prepare for a group of careers (a cluster), a group of careers within a cluster (pathway), or a single occupation.

The charts that follow show samples from two clusters and their associated pathways, sample occupations for one pathway, and a sample sequence of applicable CTE courses. The sequence applies to the pathways and occupations shown in italics.

<b>Career Cluster</b>	<b>Career Pathways</b>	<b>Sample Occupations</b>	<b>Sample CTE Course Sequence</b>
Agriculture, Food, and Natural Resources	<p><i>Plant Systems</i></p> <p>Other pathways in this cluster:</p> <ul style="list-style-type: none"> <li>• Food Products and Processing Systems</li> <li>• Animal Systems</li> <li>• Power, Structural, and Technical Systems</li> <li>• Natural Resources Systems</li> <li>• Environmental Service Systems</li> <li>• Agribusiness Systems</li> </ul>	<p><i>Plant Breeder/Geneticist</i></p> <p><i>Botanist</i></p> <p><i>Greenhouse Manager</i></p> <p>Other occupations in this pathway:</p> <ul style="list-style-type: none"> <li>• Soil and Water Specialist</li> <li>• Certified Crop Adviser</li> <li>• Tree Surgeon</li> <li>• Education/Extension Specialist</li> <li>• Golf Course Superintendent</li> </ul>	<p>To prepare for selected occupations:</p> <p>Horticulture Sciences 8034 and one of the following:</p> <ul style="list-style-type: none"> <li>• Greenhouse Plant Production and Management 8035</li> <li>• Landscaping 8036</li> <li>• Floriculture 8038</li> <li>• Floral Design I 8055</li> <li>• Specialty Horticulture Arts 8037</li> </ul>

<b>Career Cluster</b>	<b>Career Pathways</b>	<b>Sample Occupations</b>	<b>Sample CTE Course Sequence</b>
Education and Training	<p><i>Teaching/Training</i></p> <p>Other pathways in this cluster::</p> <ul style="list-style-type: none"> <li>• Administration and Administrative Support</li> <li>• Professional Support Services</li> </ul>	<p><i>Director, Childcare Facility</i></p> <p><i>Childcare Worker</i></p> <p><i>Nanny</i></p> <p><i>Preschool, Kindergarten Teacher</i></p> <p><i>Teacher Assistant</i></p> <p><i>Parent Educator</i></p> <p>Other occupations in this pathway:</p> <ul style="list-style-type: none"> <li>• Secondary Teacher</li> <li>• Special Education Teacher</li> <li>• Coach</li> <li>• Teacher Aide</li> </ul>	<p>To prepare for selected occupations:</p> <p>Early Childhood Education I 8285 <b>and</b> a combination of one or more of the following courses equivalent to a total of two 36-week courses:</p> <ul style="list-style-type: none"> <li>• Early Childhood Education II 8286</li> <li>• Family Relations 8223*/8225</li> <li>• Individual Development 8209*/8210</li> <li>• Parenting 8231</li> <li>• Introduction to Early Childhood Education 8234</li> <li>• GRADS 8213 (with cooperative education)</li> </ul> <p><i>*18-week course</i></p>

## Career Planning Guide

---

The *CTE Career Planning Guide* (CPG) is being revised to reflect the national structure of career clusters. The CPG will be published in the fall. Users will be able to connect careers and courses in ways that will enhance career planning and preparation.

## Other Career Resources

---

Check out the following resources for career planning by going to the Virginia Career Resource Network at <http://www/vacrn.net/>.

- CareerConnect (Virginia's One Stop Workforce System)
- Guide to Career Prospects in Virginia
- KnowHowVirginia
- *r u ready*
- Virginia Career Resource Network
- Virginia Department of Professional and Occupational Regulation
- Virginia Employment Commission
- *Mid-Atlantic Guide to Information on Careers (MAGIC)*
- Virginia's Electronic Labor Market Access System (VELMA)
- Virginia Career VIEW Career Information

## Reporting by Career Cluster

---

In addition to using career clusters for student career exploration and instructional planning, local school divisions report to the USDOE the numbers of students who are exploring or preparing for each career cluster. To help teachers and administrators with this report, the *Career and Technical Education Reporting Systems (CTERS) User's Manual* assigns each CTE course to a career cluster. These career cluster assignments are repeated in the program area sections of this guide. Because some career clusters overlap (have similar occupations), teachers may have a choice of more than one cluster and should select the most appropriate one for their report.





## **Section 12: Career Exploration and Middle School 2006-2007**

### **CTE in Middle School:**

- Course Titles and Descriptions
- Credit for High School Courses Taught in Middle School





## Section 12: Career Exploration in Middle School

Students in middle school have the opportunity to gain a foundation in technical fields and explore careers through a variety of career and technical courses described below. These experiences will help students make sound choices related to their academic and elective program of studies in high school.

### Agricultural Education

---

#### **Introduction to Agriscience 8002**

**Grade Level:** 6 (18 weeks or less)

Middle school students develop an awareness of the relationships between agriculture and science. Major concepts covered in the course include awareness of agriculture, the world of work, agribusiness careers, human relations, and scientific principles applied in agriculture.

#### **Agriscience Exploration 8003**

**Grade Level:** 7 (18 weeks)

Students explore science as it relates to agriculture and develop an understanding of human relations, communication, the importance of agriculture to the economy, and key scientific terms related to the field of agriculture.

#### **Agriscience and Technology 8004**

**Grade Level:** 8 (18 or 36 weeks)

Through laboratory activities, students apply scientific principles to the field of agriculture, including plants, animals, and ecology/conservation. The course introduces students to biotechnology as it relates to agriculture.

### Business and Information Technology

---

#### FOUNDATION COURSES

#### **Computer Solutions 6609**

**Grade Levels:** 7, 8 (6/9/12/18 weeks)

#### **Computer Solutions 6610**

**Grade Levels:** 7, 8 (36 weeks)

Students use the computer as a problem-solving tool to complete a variety of projects. Students participate in team-building activities that include both academic and business competencies. Basic touch keyboarding instruction is provided early in the course.

#### **Keyboarding 6150**

**Grade Levels:** 6, 7, 8 (6/9/12/18 weeks)

This course is designed for middle school students to develop and enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce personal, educational, and professional documents.

**Make It Your Business 6110**

**Grade Levels:** 6, 7, 8, 9 (6/9/12 weeks)

**Make It Your Business 6111**

**Grade Levels:** 6, 7, 8, 9 (18 weeks)

Students are provided opportunities to run a small group or class business based on their own design for providing a service or product needed at their school. Students learn business terminology, basic entrepreneurship concepts, and fundamental business operating principles in this course. Design of course content provides for interdisciplinary instruction.

**Career Pathways 9070/9071/9072**

**Grade Levels:** 6-12

These career exploration offerings are recommended for Business and Information Technology and Family and Consumer Sciences students. See Section 8: Career Connections for course descriptions.

**MIDDLE/SECONDARY**

The following courses are allowed in both middle and/or high school but may be appropriate for middle level students. If the local school division wishes to offer the courses for credit, they must be taught exactly as the high school courses are taught.

See Section 2: Business and Information Technology for additional information about these courses.

**Computer Applications 6611**

**Grade Levels:** 7, 8, 9, 10 (36 weeks)

**Computer Applications 6617**

**Grade Levels:** 7, 8, 9, 10 (18 weeks)

**Prerequisite:** Keyboarding\* recommended

Students develop or review correct keyboarding techniques and gain a basic knowledge of word processing, spreadsheet, database, graphics, and telecommunications applications. Students demonstrate an understanding of computer concepts through application of knowledge. Students learn to use software packages and local and worldwide network communications systems. Grade 8 Computer/Technology Standards of Learning are incorporated and reinforced in this course.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

**Digital Input Technologies 6160** (18 weeks)**Digital Input Technologies 6161** (36 weeks)

**Grade Levels:** 7, 8, 9 (18 weeks)

**Prerequisite:** Keyboarding\* is recommended for 18-weeks course.

The Digital Input Technologies course introduces new and emerging tools that are quickly becoming standard in today's workplace. Students develop proficiency using Personal Data Assistants (PDAs), speech recognition software, and input tools for entering and manipulating text and data. The 36-week course offers secondary-level keyboarding skills.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

**Information Technology Fundamentals 6670**

**Grade Levels:** 9, 10 (36 weeks)

**Prerequisite:** Keyboarding\* is recommended.

Information Technology IT Fundamentals introduces the essential skills needed for students to pursue specialized programs leading to technical and professional careers and certifications in the IT industry. Students have an opportunity to investigate career opportunities in four major IT areas: Information Services and Support, Network Systems, Programming and Software Development, and Interactive Media. The focus of the IT Fundamentals course is on introducing skills related to information technology basics, Internet fundamentals, network systems, computer maintenance/upgrading/troubleshooting, computer applications, programming, graphics, Web page design, and interactive media. Students explore ethical issues related to computers and Internet technology and develop teamwork and communication skills that will enhance their employability.

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

**Keyboarding 6151**

**Grade Levels:** 9, 10, 11, 12 (18 weeks)

This course is designed for secondary school students to develop and enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce personal, educational, and professional documents. (Students who can demonstrate touch keyboarding skills may test out and enter into the applications semester—6153—to develop document preparation skills.)

**Keyboarding Applications 6152**

**Grade Levels:** 9, 10, 11, 12 (36 weeks)

This course is designed for secondary school students to develop and enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce a variety of personal, educational, and professional documents.

**Keyboarding Applications 6153**

**Grade Levels:** 9, 10, 11, 12 (18 weeks)

**Prerequisite:** Keyboarding (6150 or 6151)\*

Students enhance touch skills for entering alphabetic, numeric, and symbol information on a keyboard. Students compose and produce a variety of personal, educational, and professional documents. (Students may enroll in this applications semester—6153—after successful completion of previous keyboarding coursework or a documented performance test/record of 6150 or 6151 competencies.)

\*Keyboarding course(s) or teacher-approved demonstrated and documented touch keyboarding skills

**Principles of Business and Marketing 6115**

**Grade Levels:** 9, 10 (36 weeks)

**Principles of Business and Marketing 6116**

**Grade Levels:** 9, 10 (18 weeks)

Students explore the roles of business and marketing in the free enterprise system and the global economy. Students study how the American economy operates and prepare to make decisions as consumers, wage earners, and citizens.

## Family and Consumer Sciences

---

### **Exploring Work and Family Roles**

8204 Exploratory Grade 6

8206 Exploratory Grade 7

8208 Exploratory Grade 8

8241 Exploratory 6 weeks

8242 Exploratory 9 weeks

8243 Exploratory 12 weeks

8244 Exploratory 18 weeks

8245 Exploratory 36 weeks

The middle school exploratory courses provide a foundation for management of individual, family, work, and community roles and responsibilities. Students explore concepts and practice skills related to problem solving, leadership, interpersonal relationships, ethical practices, career interests, environmental issues, and high-quality work. Mathematics, science, language, social sciences, fine arts, and technology are integrated throughout the program. Exploring Work and Family Roles is the foundation for Family and Consumer Sciences programs on the high school level.

**GRADS 8211/8212** (18/36 weeks)

**Grade Levels:** 6, 7, 8

Students enrolled in the **Graduation, Reality, And Dual-role Skills Program (GRADS)** concentrate on developing self-esteem; using effective communication skills; maintaining positive relationships; promoting wellness, prenatal, and postnatal care; evaluating the cost of parenthood; adjusting to parenthood; understanding child development; providing child care; managing family relationships; exploring careers; applying employability skills; managing economic resources and expenditures; and balancing work and family. Teachers highlight the basic skills of math and science when appropriate in the content.

## Health and Medical Sciences

---

### **Health and Medical Sciences Exploratory 8370**

**Grade Level:** Middle School (18 weeks, single period)

This course follows a complementary course such as Careers and You. Students explore families of health careers and related occupations, participate in self-awareness activities, and receive an overview of the national health industry. Course content may also include the criteria for entering certain biomedical scientific careers and activities dealing with communication, problem solving, and critical thinking.

## Marketing

---

### **Make It Your Business 8109**

**Grade Levels:** 6, 7, 8, 9 (6 weeks)

### **Make It Your Business 8112**

**Grade Levels:** 6, 7, 8, 9 (9 weeks)

### **Make It Your Business 8113**

**Grade Levels:** 6, 7, 8, 9 (12 weeks)

### **Make It Your Business 8114**

**Grade Levels:** 6, 7, 8, 9 (18 weeks)

Students are provided opportunities to run a small group or class business based on their own design for providing a service or product needed at their school. They learn business terminology, basic entrepreneurship concepts, and fundamental business operating principles in this course. Design of course content allows for interdisciplinary instruction. Academic knowledge and skills (mathematics, science, English, and history/social science) related to the content are a part of this course.

Computer/technology applications supporting this course are studied.

## Technology Education

---

### **Careers and You 8475**

**Grade Levels:** 5, 6 (9, 18, or 36 weeks, single period)

Elementary or middle school students may enroll in this course prior to taking career and technical or career exploratory courses. They investigate the 16 career clusters designated by the U.S. Office of Education by focusing on

- understanding oneself in relation to work
- understanding and simulating work styles
- identifying and simulating selected careers
- planning for future exploratory courses or activities.

**Introduction to Technology 8483** (36 weeks)

**Introduction to Technology 8482** (18 weeks)

**Introduction to Technology 8484** (12 weeks)

**Introduction to Technology 8481** (9 weeks)

**Grade Level:** 6

Students first study the basic elements of all technology, including processes, energy, information, and people. They explore up to four systems of technology, including construction, transportation, communication, and production/manufacturing. Finally, they relate the impact of technology on society, environment, and culture to future consequences and decisions.

**Inventions and Innovations 8461** (36 weeks)

**Inventions and Innovations 8464** (18 weeks)

**Inventions and Innovations 8485** (12 weeks)

**Grade Level:** 7

Students make models of significant inventions that have advanced society. After studying these developments, they explore contemporary technological problems facing them, their community, or the world and apply systematic procedures to invent new products or innovations as solutions.

**Technological Systems 8462** (36 weeks)

**Technological Systems 8463** (18 weeks)

**Technological Systems 8486** (12 weeks)

**Grade Level:** 8

Students combine resources and techniques into systems, realizing technology as a system. By simulating systems, assessing their impacts, and relating this experience to the two previous levels, students gain an insight into how to approach the problems and opportunities of a technological world in a broad sense. They also explore occupational areas and educational programs for technology-oriented careers.

## **Career Connections**

---

### **Career Pathways Phase 1 (Career Exploration) 9070**

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 1 prepares students to be "career investigators." To obtain the title, students must assess their role in society, identify their role as a worker, analyze their personal assets, complete a basic exploration of career clusters and select career fields or occupations for further study, and secure a career investigator (job shadowing) position with a local employer.

### **Career Pathways Phase 2 (Career Skills) 9071**

**Grade Levels:** 6-12 (Time and schedule locally determined)

Phase 2 consists of an in-depth study of one to four or more career clusters through a variety of investigative activities with local employers. Students observe, analyze, and report on the demand for workers, worker qualifications, organizational structures, quality control measures, selected policies and regulations, ethical issues, and rewards of work. Students who complete Phase 2 successfully qualify to become "career analysts."

### **Education for Employment (EFE)**

Introduction 9075 (for Students Identified as Disadvantaged—18 weeks)

Introduction 9076 (for Students Identified as Disadvantaged—other than 18 weeks)

Introduction 9082 (for Students with Disabilities—18 weeks)

Introduction 9083 (for Students with Disabilities—other than 18 weeks)

**Grade Levels:** 6, 7, 8, 9

Students explore independent living and workplace skills by identifying individual assets, interests, aptitudes, talents, and current occupational abilities. Through practical experiences related to daily living and work, students determine strategies to improve their assets and ways to emphasize their strengths at home, school, and in the workplace.

### **ProTeam 9060/9061**

**Grade Level:** 7 or 8

ProTeam is an exploratory class for students in grades 7 and 8 with a career interest in teaching and education. The curriculum is designed to help students set realistic goals that include the steps to prepare for successful completion of high school and college, including an emphasis on career development competencies. The eight course modules are *I Can Self-Reflect*, *I Can Communicate*, *I Can Teach Others*, *I Can Be Different*, *I Can Make Decisions*, *I Can Set Goals*, and *I Can Think Positively*. The course has an emphasis on service learning, cooperative work groups, teaching-like experiences, and family involvement. This program shall be articulated with a Teacher Cadet program at the high school.

## **Credit for High School CTE Courses Offered in Middle School**

---

In addition to exploratory courses, school divisions may offer some career and technical courses to middle school students for high school credit. The courses must be the same length and taught with the same content as the courses taught at the high school level. Students should see the school counselor for a complete explanation of course offerings for credit.

- Basic Agricultural Mechanics and Plant Science 8006
- Basic Agricultural Mechanics and Animal Science 8008
- Career Pathways 9070/9071
- Computer Applications 6611
- Digital Input Technologies 6160/6161
- Principles of Business and Marketing 6115
- Principles of Business and Marketing 8115
- Keyboarding 6151/6152/6153
- Information Technology Fundamentals 6670
- Introduction to Health and Medical Sciences 8302
- Resource Management 8214/8219
- Geospatial Technology 8423
- Materials and Processes Technology 8433
- Technology Foundations 8403





## **Section 13: Career Awareness and Elementary School 2006-2007**

### **A Foundation for Career Education:**

- Academic Courses and Careers
- CTE Instruction and Career Awareness





## Section 13: Career Awareness and Elementary School

Children begin in early education to lay a foundation for career development through rigorous courses in academics. As an example, academic courses offer information about different jobs and the basic concepts of economics, work ethics, and career choice.

### Elementary School Experiences

---

In addition, career and technical education offers three areas of instruction to elementary school students to help them prepare for future roles and responsibilities:

**Careers and You 8475:** This course helps elementary school students explore a variety of careers.

**Keyboarding Instructional Units:** These units are designed to familiarize students with basic computer operations and the elementary functions, layout, and use of the keyboard. The touch skills of entering text/data for language arts comprise the major goal at the elementary grades.

**Technology Awareness 8410:** Technology Education experiences in the elementary school are designed to help children learn and achieve the educational goals of the total elementary school program. These experiences orient children to technology, develop psychomotor skills, and provide the basis for informed attitudes about technology's influence on society. Technology-based activities integrated into the total elementary school curriculum, motivate children and reinforce learning while children gain a degree of technological awareness.





## **Section 14: Comments and Questions 2006-2007**

### **Want to get in touch?**

- Office of Career and Technical Education Contact Information





## Section 14: Comments and Questions

If you have general comments, questions, or suggestions about the content of the *CTE Administrative Planning Guide*, please call or e-mail the following:

**Elizabeth M. Russell, Director**

Office of Career and Technical Education Services  
Virginia Department of Education

Phone: 804/225-2847 Fax: 804/371-2456

[Elizabeth.Russell@doe.virginia.gov](mailto:Elizabeth.Russell@doe.virginia.gov)

**James A. Gray, Associate Director**

Office of Career and Technical Education Services  
Virginia Department of Education

Phone: 804/225-2833 Fax: 804/371-2456

[Jim.Gray@doe.virginia.gov](mailto:Jim.Gray@doe.virginia.gov)

**Anne Rowe, Career Cluster Coordinator**

Business, Family and Consumer Sciences, Marketing, Career Connections  
Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2838 Fax: 804/371-2456

[Anne.Rowe@doe.virginia.gov](mailto:Anne.Rowe@doe.virginia.gov)

**George Willcox, Career Cluster Coordinator**

Agricultural Education, Health and Medical Sciences, Technology Education, Trade and Industrial Education  
Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2839 Fax: 804/371-2456

[George.Willcox@doe.virginia.gov](mailto:George.Willcox@doe.virginia.gov)

If you have comments, questions, or suggestions concerning a specific program/content area, please call or e-mail the following:

***Agricultural Education***

Contact: **Dr. Glenn A. Anderson, Specialist**

Office of Career and Technical Education Services  
Virginia Department of Education

Phone: 804/225-2840 Fax: 804/371-2456

[Glenn.Anderson@doe.virginia.gov](mailto:Glenn.Anderson@doe.virginia.gov)

***Business and Information Technology***

Contact: **Judith Sams, Specialist**

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/371-0196 Fax: 804/371-2456

[Judith.Sams@doe.virginia.gov](mailto:Judith.Sams@doe.virginia.gov)

***Family and Consumer Sciences***

Contact: **Helen Fuqua, Specialist**

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 225-2826 Fax: 804/371-2456

[Helen.Fuqua@doe.virginia.gov](mailto:Helen.Fuqua@doe.virginia.gov)

***Health and Medical Sciences***

Contact: **JoAnn Wakelyn, Specialist**

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2842 Fax: 804/371-2456

[Joann.Wakelyn@doe.virginia.gov](mailto:Joann.Wakelyn@doe.virginia.gov)

***Marketing***

Contact: **Anne Rowe, Career Cluster Coordinator**

Business, Family and Consumer Sciences, Marketing, Career Connections

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2838 Fax: 804/371-2456

[Anne.Rowe@doe.virginia.gov](mailto:Anne.Rowe@doe.virginia.gov)

***Technology Education***

Contact: **George R. Willcox, Career Cluster Coordinator**

Agricultural Education, Health and Medical Sciences, Technology Education, Trade and Industrial Education

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2839 Fax: 804/371-2456

[George.Willcox@doe.virginia.gov](mailto:George.Willcox@doe.virginia.gov)

***Trade and Industrial Education***

Contact: **Dr. Richard L. Ross, Specialist**

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-2828 Fax: 804/371-2456

[Richard.Ross@doe.virginia.gov](mailto:Richard.Ross@doe.virginia.gov)

***Career Connections Service Area***

Contact: **Scott Kemp, Specialist**

Office of Career and Technical Education Services

Virginia Department of Education

Phone: 804/225-3370 Fax: 804/371-2456

[Scott.Kemp@doe.virginia.gov](mailto:Scott.Kemp@doe.virginia.gov)

